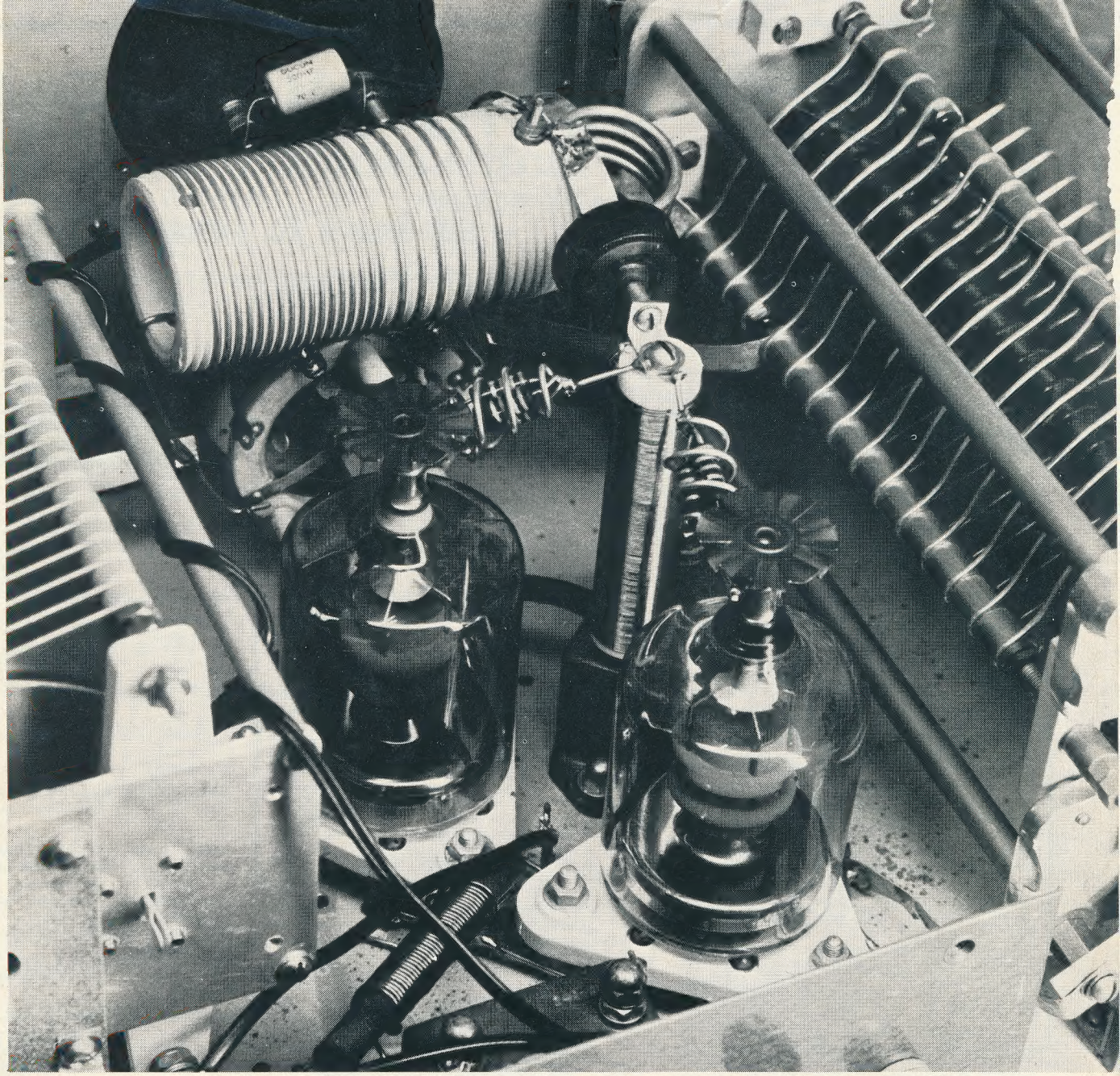
amateur radio



VOL. 44, No. 5 MAY, 1976

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COVER PHOTO

A close-up of the "works" of the VK3AAR 400 W PEP linear covering 80 to 10 metres.

Photo: VK3YCY

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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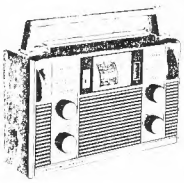

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a truly portable communications receiver, based on the WADLEY LOOP principle, the same principle as applied in the DELTAHET and RACAL receivers. A truly crystal-controlled highly sensitive multiple heterodyne portable receiver of exceptional stability with continuous, uninterrupted coverage from 500 kHz to 31 MHz.

All for **$239** F.O.R.

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$235 — Extra Channel Crystals $10 Set

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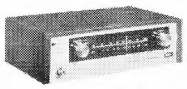
AM/FM STEREO TUNER MODEL FT300



SPECIFICATIONS — FM Section: Tuning range 88-108 MHz; Sensitivity, 5uV for 30 dB S/N; Signal to noise ratio, 55 dB; Intermediate frequency, 10.7 MHz; Distortion 1%; MPX separation, 25 dB; Antenna, Built-in line cord antenna, plus 300 ohm balanced input for external antenna; Output level, 200 mV.

AM Section: Tuning range, 525-1650 kHz; Intermediate frequency, 455 kHz; Sensitivity, 300 uV/M; Signal to noise ratio, 40 dB; Antenna, Built-in Ferrite Bar Antenna, plus input for external system; Output level, 200 mV; Dimensions, 290 W x 100 H x 180 D (mm).

$69.00 — Pack and Post $3

LAFAYETTE HA310 WALKIE TALKIES, 27 MHz, 1 watt, 3 channel. Fitted with 27.240 MHz crystals. PMG approved type. **$69.90 each**

1 WATT 2 CHANNEL TRANSCEIVER with call system. 27.240 MHz. 12 transistor. PMG approved type. **$45 each or $89 a pair**

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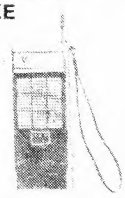

- **WITH CALL SYSTEM**
- **EXTERNAL AERIAL CONNECTION**

SPECIFICATIONS, NC-310

Transistors: 13
Channel Numbers: 3, 27.24 OMHz
Transmitter Frequency Tolerance: ±0.005%
RF Input Power: 1 watt
Tone Call Frequency: 2000 Hz
Receiver type: Superheterodyne
Receiver Sensitivity: 0.7 uV at 10 dB S/N.
Selectivity: 45 dB at ±10 kHz
IF Frequency: 455 kHz
Audio Output: 500 mW to External Speaker Jack
Power Supply: 8 UM-3 (penlite battery)
Curernt Drain: Transmitter: 120-122 mA
Receiver: 20-130 mA.

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Post & Pack $1.50 per unit.

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We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.165	27.255
27.085	27.225	27.265
27.125	27.235	27.880
27.155	27.240	27.910

$8 A PAIR (Transmit and Receive)

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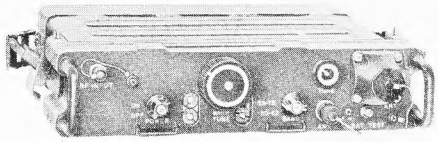

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Originally used in conjunction with PRC25 which covers 30-75 MHz FM. Requires 1-4 watts drive and gives a nominal 25 watts out. Brand new in [illegible]d box.

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58 OHM COAX. CABLE. 100 yd. rolls, ⅛ in. diameter. **$12 roll**

52 OHM COAX. CABLE. ¼ in. diameter. **45c yd., 50c metre**

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SPLIT STATOR CAPACITORS with screwdriver slot drive 9PF-17PF-25PF. Brand new Eddystone type. **$2.50 each**

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amateur radio

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QSP FEDERAL CONVENTION

The 40th Federal Convention will be held this month from 7th to 9th at Diplomat Motor Inn, Acland Street, St. Kilda, in Melbourne.

There is every reason to believe that the volume of business will be so great that the time allowed may barely suffice.

In fact, your Executive is involved with so much of major importance to amateur radio throughout Australia that time is at a premium.

Preparations for WARC 1979 will occupy many hours of work each week inside and outside the working groups.

Consideration of the Arnold Report and any resultant action will occupy much time and thought.

Liaison with IARU is essential if the amateur service is to put up a united front.

There are many items of detail for consideration at the Convention. Detail which will affect us all in one way or another. Some degree of priorities will become essential.

Quite apart from this enormous work load there exists some need to re-examine the outcome of previous Conventions in specific areas.

If you cannot come along to the Convention, even for a short period, wish us well. If you can come along you will be very welcome.

Amateur radio is in need of your support and assistance. Help us to plan for the continuation of a bright future — better, if possible, than the past.

D. A. WARDLAW, VK3ADW
Federal President ■

EDITOR'S DESK

Bill Roper, VK3ARZ

Naturally enough in these days of inflation, economics dictates the size and presentation of AR.

It is interesting to note that the major overseas amateur radio magazines have now changed size to approximately that of this magazine, which confirms what we have known for a long time. This three column format is the most economical and practical size for us to use.

In August 1974 I was forced to place the "Contents" index on the front cover to solve a space problem. This move was favoured by many members and has now become a feature of AR.

If you looked closely at last month's issue you will have noticed some minor changes in layout. These have improved the appearance of your magazine, particularly the regular columns.

Although there are many problems associated with producing AR each month, two problems that have been with us for a long time are still causing concern. They are suitable photographs for the front cover, and drafting assistance for preparation of circuit diagrams and drawings.

Photographs of equipment are interesting, but AR is not just a technical magazine. We need photographs of people and their involvement with our wonderful hobby. Field day, contests, JOTA, Oscar, WICEN, QSL bureaux, ATV, RTTY, FM repeaters, are just a few that spring to mind.

Many amateurs are keen photographers. How about combining your interests. Like everybody else contributing to your magazine, we cannot pay you, but if your photograph is published complete acknowledgement will be given. Perhaps we could have an annual award of books from Magpubs for the best photograph published.

Photographs should preferably be of high contrast, glossy finish, and about eight to ten inches square. However, other types can sometimes be used.

Difficulty in having circuit diagrams and drawings prepared for publication is the main reason why some articles are delayed for many months before appearing in AR. We need at least three new draftsmen. Previous experience would be preferred; we will supply the drafting materials. If you are looking for some way to put something back into your hobby, to become involved in your magazine, perhaps you can help us in this area. If so I would like to hear from you.

Cyril VK3AUM has brought to my attention the problems facing blind amateurs in trying to keep abreast of what is happening in amateur radio and in the WIA. Particularly when it is not possible to have someone read AR to them.

Unfortunately the WIA is not in a position to produce a "talking book" version of AR, but what a worthwhile venture for some amateur(s) to undertake for our several blind members.

If you would like to assist by reading AR on to tape, please let me know.

In addition to the comment in the Letters to the Editor column this month, Geoff VK3AMK has also commented on why so few VK amateurs appear in the ARRL DXCC lists. There is no doubt about it that the Australian DXCC is a keenly sought award and is deservedly preferred by Australian amateurs.

The small QSP paragraphs that appear throughout the magazine each month are an attempt to bring to you a synopsis of international news and views in the world of amateur radio. Reference to the ARRL DXCC listings comes under the heading of news, and in no way was intended as a reflection on the VK DXCC.

Only three articles were received for publication during March. We need a lot more! ■

QSP

NEW ZEALAND GOLDEN JUBILEE

Did you read "IARU News" on p.21 of AR for Nov. '75 about the NZART Golden Jubilee Conference in Auckland 4th to 7th June 1976? New Zealand is the currently popular holiday area because of their dollar devaluation. Add a bonus like their Conference arrangements and it becomes difficult to discover anything more attractive. Look for ZL1AA on about 3566 kHz each evening around 08.00 to 0.830hZ if you want more information or write to the Conference Secretary, PO Box 23-680, Papatoetoe East, Auckland, NZ. The registration fee is $18.50 (NZ) and the keynote address will be given by Dr. W. H. Pickering of the Jet Propulsion Laboratory in the USA. Dr. Pickering is in fact a Kiwi and was a foundation member of the Wellington Branch of NZART.

NATIONAL LIBRARY OF AUSTRALIA

Did you know that if any publication is printed in Australia for sale to the public a good copy of it must be lodged immediately with the National Library in Canberra? Copies of AR are supplied to the National Library in addition to the State Library in Melbourne so as to comply with legal requirements. The same applies to the Call Book. Copies of inserts into AR are not sent to the National Library since it is understood these do not go on sale to the public. However the National Library official has pointed out that if any document contributes to current information or future research on the subject area with which it is involved, the submission of a copy for the national collection helps the Library's responsibility to develop and maintain a comprehensive collection of Library material relating to Australia and the Australian people. ■

WIANEWS

As might have been expected a number of additional Agenda Items came in from Divisions for discussion at the 1976 Federal Convention being held from 7th to 9th of this month at the Diplomat Motor Inn in Ackland St., St. Kilda.

The VK5 Division have put forward 14 Agenda Items plus a possible General Business Item suggesting that Ionospheric Prediction Charts should re-appear in AR showing the MUF/ALF curves. Charts of this kind were dropped from AR from March 1972. The last ones were on p. 8 of AR for Feb. 1972. The problems here will be one of drafting and one of the space required and the Publications Committee are very well aware of the situation. The unknown factor would be the percentage of amateurs interested in these charts which are likely to reflect much inaccuracy at this point in the sun spot cycle apart from the other factors now deemed desirable in preparing predictions. Please see the series of Ionospheric Predictions articles by Len Poynter VK3ZGP in recent ARs.

The South Australian Agenda Items cover theory examination exemptions for equivalent or better qualifications obtained from tertiary and other organisations to ease pressures on the present system and to make a study of what other theory examinations would be acceptable. Another seeks representations to be made for uninterrupted examinations.

A fourth wants standardisation on associated membership for Novice Licencees and a fifth seeks representations to have a longer duration morse test so that the candidate's best 5 minute receiving segment be marked. A sixth is introduced to clarify Divisional membership upon transfer of a member interstate.

The Division would like to see a policy adopted towards a standardisation of FM channel bandwidth/deviation for all WIA Band plans and in detailed submissions puts forward a proposal that the Institute should negotiate for ATV repeaters to be authorised with inputs in the 420-450 MHz band and outputs in the 576-583 MHz band since the latter band is covered by many domestic TV receivers manufactured overseas. The VK2 Division has also put forward an Agenda Item for the allocation of UHF TV channels 34 and 35 for Institute broadcasts and the like on similar grounds and stating that amateur color TV transmissions are already being made in this band.

The VK5 Division wants negotiations to be begun for the authorisation of official WIA broadcasts at any time.

The remainder of their Agenda Items deal with Contests and Awards. One interesting item suggests that the RD trophy should become the property of the VK5 Division when the Division wins it 6 times in a row. Another suggests that more points should be scored in field days by stations using non-fossil fuels. Yet another suggests that P2 stations should be eligible for Australian Awards if the operator is a WIA member. These notes are necessarily over-abbreviated to save space as the items in question will probably be debated around about the time you receive May AR.

From VK2 comes news of 70 cm repeater and simplex channels, spacings and a numbering system for consideration by the Convention in addition to their proposals relating to an exclusive EME segment from 432.000 to 432.050 MHz.

The Report from AARTG relating to RTTY idents and use of special codes such as ASCII has come forward and an Agenda Item will allow debate on this before official representations begin.

Yet other Agenda Items by the Executive will permit debate about the work and composition of Amateur Advisory Committees, work carried out by the IARU and preparations for WARC 1979.

EXECUTIVE

Two meetings of the Executive were held during March. The first was a special meeting to discuss the Arnold Report. A small matter which came up indicated problems about contacting any amateur in Papua New Guinea interested in the IARU. Since PNG is a member of the ITU and will therefore have a vote in WARC 1979 perhaps an amateur society there could be formed to aid in the work of the IARU but as previously emphasised the WIA itself cannot be seen to take any initiative in this matter.

The Federal SWL Awards Manager will be going overseas in May and the Federal Awards Manager has kindly agreed to take over these duties.

11 METRE BAND

The ACT Division have produced guide lines for operators on the 11m band as promised at the 1975 Convention. This will come up for discussion as the matter is still "on the table". It is interesting to observe that by a footnote the amateur service "may operate" between 26.96 and 27.23 kHz in Region 2, VK and ZL. No restrictions apply. As a result the amateur service in this band has equality of right to operate with stations of the fixed and mobile services in the band and all must accept IMS interference.

PIRATES

A letter received from the Minister for Post and Telecommunications during March assures the WIA that the Government "does not contemplate changing the long-standing policy adopted in relation to the operation of a Citizens Band Radio Service in Australia as was enunciated by the PMG" in the letter published on page 8 of AR Oct. 1974. He goes on to say that the Government is most concerned about illegal radio operators and advises that a number of ways of more effectively dealing with the problem have recently been examined.

AX CALL SIGN

An approach has been made to "Central office" for VK stations to be granted the optional use of the AX prefix for the period 1st July 1976 to 31st July 1977 to mark the 75th year of Australian Federation. This idea derived from the VK4 Division.

As you will have seen from the "Editor's Desk" column in April AR VK3TX will shortly relinquish his post as Manager of the Key Section. At the time of writing efforts are being made to find a suitable replacement for him.

FIRST NOVICE EXAM

Some criticisms have been levelled at the 5 wpm morse exam for Novices as well as about some of the 50 "multi-choice answer" type of questions in the one hour Novice theory exam. It should be noted that the length of the "dit" determines the morse code speed but many amateurs not particularly proficient in the art often prefer the actual letters to be sent at a greater speed than the spaces in between since this facilitates rhythm recognition as opposed to translating from one language to another. Get an expert to send correctly at 5 wpm (this could be difficult) speed and you will observe the long-drawn-out effect of very slow CW. These were some comments on the morse paper; others seemed to favour high speed characters with long spaces in between. Unfortunately there can be only one standard. Yet others complained about a tone change during the receiving test.

Comments on the theory paper varied from "a reasonable standard" to "some very difficult questions unanswerable by an AOCP holder". Perhaps the lack of some syllabus to follow coupled with inadequate home-work by the candidate seem to be comments on the problem areas as the great majority of the questions were definitely elementary although some required more thought than others. Copies of the Novice exam paper were difficult to obtain and this is likely to be the future pattern because of the alleged difficulty in finding enough elementary questions from so simple a subject.

The 30 minute "Regulations" paper appeared quite straightforward to anyone who had studied "the Handbook" and bearing in mind that this paper is the same for everyone. Incidentally the revision of the Handbook is under way — as it has been for some time. The Institute is doing work on this through the good offices of VK5TY but delays occurred awaiting the Novice licensing legislation followed by other revisionary legislation to the act. The outcome of the latter is still unknown although it has now been assumed to have lapsed. Whether or not WARC 1979 and its preparatory work will affect the revision of the Handbook is another question mark.

Since the Novice exam paper was the first in the series and the number of candidates was unusually great there is every reason to believe that future exams (morse in May, all sections in November) should begin to run much more smoothly. A suggestion came up that the Novice Investigation Committee of the

early 1970s should be revived but this could be overtaken by events — refer to April WIANEWS in the paragraph beginning "Two other complex matters also received attention".

BROADCAST MATERIAL

At the end of March arrangements were made to produce "Federal" broadcast tapes for Divisional broadcasts. Thanks to the work of Bill Roper VK3ARZ, and Ron Fisher VK3OM, this additional news service should assist in the dissemination of amateur radio news to reinforce the written word in AR and to reach the non-WIA listener.

A news release from the ABCB indicated as a by-line that Mr. Jim Wilkinson will be taking up an appointment with the Post and Telecommunications Department. It is understood he will head the Radio Frequency Management Division of the Department — a return to his former stamping ground. An extract was received from a publication entitled "Telecom 2000" put out by the ATC and sent in by a keen member. This leaves little to the imagination in relation to VHF/UHF frequencies for the mobile services and seems likely to govern thinking for WARC 1979. Unfortunately it is too lengthy for reprint in AR but Divisional Federal Councillors possess a photocopy of section 4.

WARC 1979

In relation to WARC 1979 please see IARU News in this issue. ■

QSP

CRO PHOSPHORS

The Feb. 1976 issue of CQ-TV (available on subscription of $4.50 per annum from "Magpubs") contains details of 35 American JEDEC "P" series of phosphors and would be of interest to many.

INSURANCE

Latest information from the USA (e.g. Ham Radio QST Feb. '76) indicates that thefts of rigs from motor vehicles has assumed such proportions that in one State (Texas) auto insurance policies are claused with an exclusion for loss or damage to CB, 2-way mobile radio or telephone, including accessories.

IARU

The Dec. '75 issue of the official IARU "Calendar" contains advice that the REP (the IARU member society for Portgual) has notified the establishment of a competing society ARP in Portugal and hence under IARU Rules requests societies not to maintain any relationships (including QSL bureau services) with ARP. The same issue includes a note that the Guyana AR Assoc. newly joined IARU as a member in 1975 and an application is pending from the R. Soc. of Swaziland. Of the 740,000 worldwide amateur radio stations some 737,000 are in countries represented by the 89 IARU member-societies. The first 6-band WAC award was issued to JA7AO in Oct. '75 — not an easy award to get.

MOBILE EXPLOSION HAZARDS

This is the heading for a section in TT by G3VA in Radio Communication Feb. '76. He writes "for many years it has been recognised that the operation of a radio transmitter in areas where blasting operations are being carried out represents some degree of hazard owing to the possibility of small electrical sparks". Similarly this can cause explosions due to the ignition of flammable gas mixtures. Some work, he writes, has been done on this lately which shows that ignition of explosive mixtures can be due to any sparks which may be produced by natural wires or metallic structures forming resonant aerials, that this is most likely to occur at frequencies from 3 MHz upwards and that as frequencies increases there will be a tendency for any sparks to be maintained over a longer period thus reducing the power needed for ignition to occur. All the more reason not to operate anywhere near re-fuelling stations and particularly not when your car or boat is being filled up with petrol.

SPECIAL OE PREFIX

To celebrate 50 years of amateur radio, special prefixes may be used by Austrian stations from 1st April to 30th June 1976 using OE50 in place of the OE prefix. Thus OE1XA becomes OE50/1XA, OE3CL becomes OE50/3CL and so on. Jan. '76 RI News.

NEW ITU MEMBERS

According to IARU Region 1 News, Jan. '76 Korea (Democratic People's Republic) and Mozambique (People's Republic) have acceded to the ITU Convention thus bringing the total membership up to 146.

NEW CALL SIGNS

Contrary to QSP items previously published, the IARU Region 1 News for Jan. '76 shows the call sign series D2A-D3Z as being allocated provisionally by the ITU to the Republic of Mozambique. D4A-D4Z and D5A-D5Z are shown as provisionally allocated to the Republics of Cape Verde and Liberia respectively.

CONGRATULATIONS

A snippet from a professional journal, sent in by an anonymous reader, tells us that Surg. Capt. Jim Lloyd, the Executive Vice-Chairman has been appointed Director General, Naval Health Services with effect 18th May. Sincere congratulations Surgeon Rear Admiral S. J. Lloyd.

OLD TIMERS CLUB

The advertisement on p.25 of AR March '76 may have alerted many old timers (holding an amateur licence 25 or more years ago, qualifies) that a local group now functions. About 60 sat down to dinner on 10th March, including some from interstate and from country areas, and a most enjoyable evening ensued. The gathering included a spry 85-year-old amateur therefore many items of historical interest were discussed and no doubt were noted by the Chairman VK3ML, assisted by VK3DH and Federal Historian VK3ZS. A club was formed so if you require further details, please write to VK3ARV, QTHR, who hopes to compile (with photographs) thumb-nail sketches of 'old timers' for the record. ■

FURTHER TO THE IC202 REVIEW

Since the review of the IC 202 was published in March Amateur Radio, the English instruction manual has come to hand. This appears to have similar content to the Japanese version, but has one notable addition. There is now a full printed circuit board layout plus a voltage chart for each transistor and IC in the unit. Details are also included on the fitting of extra crystals for additional band coverage. Circuit adjustment points are also clearly shown on several internal photos. These manuals are available to those who may have received only Japanese manuals with their IC 202's purchased from Vicom International. ■

TRY THIS

Ron Cook, VK3AFW

Bill Rice, VK3ABP

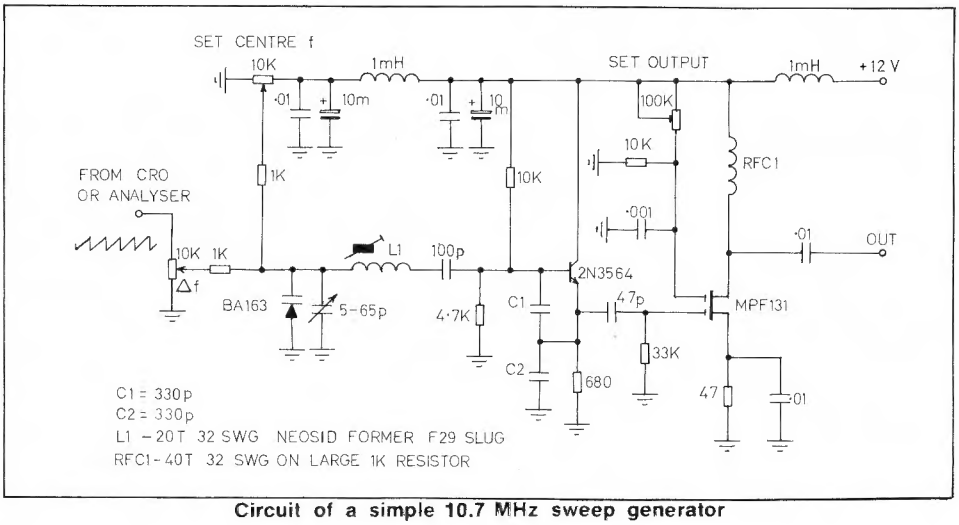
SIMPLE 10.7 MHz SWEEP GENERATOR

John Day VK3ZJF and
George N. Long VK3ZDB

We occasionally need to look at the response of an IF amp or a filter. This circuit was developed for just that requirement and can quite easily be used for any other frequency. Normally we use a spectrum analyzer as a fixed tuned receiver for its wide dynamic range of about 70 dB. However, a CRO is quite satisfactory if you are prepared to accept the limited dynamic range.

The VARICAP diode used was an ITT BA163 but could be just about any form of VARICAP you have with sufficient capacitance range. All other details should be self-explanatory: however the three capacitors in the oscillator frequency determining network should be STYROSEAL types.

The 2N3564 can be replaced by any NPN Silicon device such as the 2N3693, 2N3643, BF115, provided it will oscillate. The MPF131 is the latest version of the old MPF121 which could be used or you could use any of the following: FT0601, MPF122, 3N210, 40672. ■

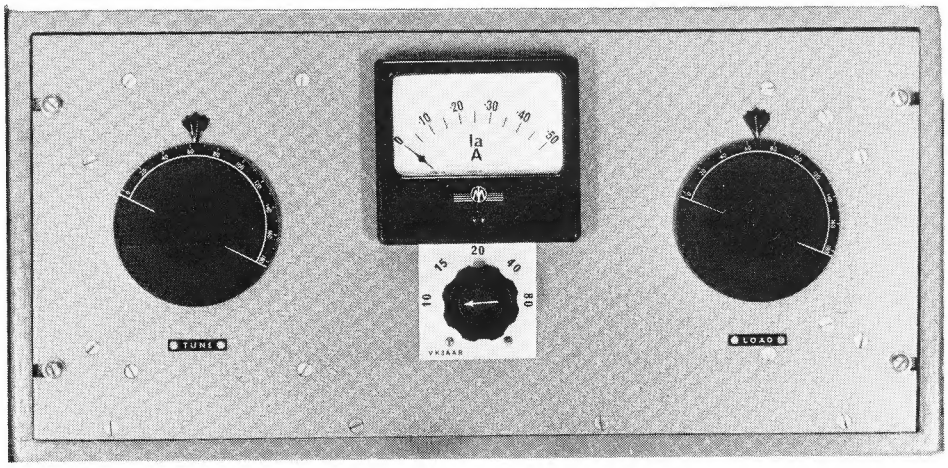


Circuit of a simple 10.7 MHz sweep generator

A LINEAR POWER AMPLIFIER FOR AUSTRALIAN CONDITIONS

PART TWO

R. A. J. Reynolds, VK3AAR



Front view of the VK3AAR 400W PEP linear

The subject of screen and bias voltages will be controlled very closely by the tubes chosen, and the manufacturers recommendations should be followed for the plate voltage chosen. There are a few observations which should be made. It is important that the bias and screen voltages are well controlled. Preferably they should be regulated and well bled. There are some tubes, particularly in the 4CX250 class, which can draw negative screen current, and if the supply is inadequately bled, the voltage will rise dramatically and the tube, to say nothing of the filter components in the supply, will fail prematurely.

The rest of the design is basically the same for all amplifiers of this class. The output stage will consist of a Pi coupler whose purpose is to match the impedance of the plate circuit to that of the antenna feedline. The plate circuit impedance will be as low as 500 ohms in the case of a handful of sweep tubes, and as high as 8000 ohms in the case of a couple of 4-125As under grounded screen zero bias with 4 k V on the anode. The required output impedance from the coupler will depend on the antenna to be used, and we have stated that it must be at least a 2:1 SWR against 50 ohms. Flexibility to match loads outside this range is, of course, to be encouraged. At the same time as providing an impedance match, the coupler will provide the output filtering necessary to remove or at least attenuate the harmonics present in all amplifiers other than purely Class A.

The Pi coupler consists of three components which, in Fig 1 are C3 L and C4. The rest of the components around this circuit will be discussed later.

An excellent treatment of the general design of Pi couplers suitable for linear amplifiers is given in the 'Radio Data Reference Book' by G. R. Jessop, which is a RSGB publication. The treatment in this book covers the design for use in various classes and services of amplifier. Both the input and the output Pi couplers are considered by means of one or two basic equations and a series of ABACs and graphs. About 20 pages of this book are dedicated to this subject, and even if a home brewer does not build his own coupler, a read over these pages will give an insight into just what happens in that rather magical unit.

Very briefly, the design involves calculating the RF waveform impedance at the anode, stating the output impedance at the transmission line, and then for each band, applying the ABACs and graphs to determine the values of C3 L and C4 required for Fig 1. The ABACs and graphs are for a loaded Q of 12 which is satisfactory. Greater or lesser Q's are used but a Q of 12 is stated to be a good compromise for filtering and component size.

Since we have opted for a power output of about 400 Watts PEP and the general trend seems to be towards a power supply of about 2500 to 3000 volts for the anode, out input impedances will all be about 4000 to 5000 ohms and we have already stated that our output impedance will have to cover the range 25 to 100 ohms. This virtually fixes the design of the output coupler. The only situations where major design variations will occur will be the case where a handful of sweep tubes is used, and the case where tubes are run at very high voltages. Both of these cases will require individual treatment. Several designs have appeared for the sweep tubes, and only the more adventuresome of us will try the 4000 Volt class. Fortunately, a single design of Pi coupler will therefore suit nearly all linears built for Australian conditions.

Considering that such a unit, or at least the coil and switch assembly, is available commercially at a very moderate cost, there does not seem to be much point in home brewing this assembly. The cost is less than a single output tube, and if one tube is saved from destruction in the 'turn on' testing by having the right inductance in circuit, then the investment will be worthwhile. A suitable unit, which covers the 80 to 10 Metre Bands, is available from William Willis & Co. Pty. Ltd., 77 Canterbury Road, Canterbury. One word of comment. The switch unit on this assembly will handle 400 Watts without distress, but operation at 600 Watts CW with an HT of 3700 Volts did cause switch failure, as did trying to use the second bank of contacts to switch a little more primary capacity for the lower bands. These failures occurred during limit testing of a prototype. (No, into a dummy load!)

However, in normal service, no problems should be experienced. The efficiency of the Willis coupler was such that no fall off of performance was observed at 10 Metres when used with high frequency tubes. A capacitance range of 30 pF to about 200 pF was required for the input capacity and up to 1000 pF is required at the output. Remembering that there will be about 10 pF anode capacity in the output tubes, this means that C3 will need to cover from 20 to 190 pF or so. There may be some difficulty in achieving this from available variable capacitors, and special precautions may need to be taken. This will be discussed in the construction section of this article. Since there may be a desire to feed a low impedance aerial directly on 80 metres, a 1000 pF variable in the output may need to be augmented with another 750 pF fixed capacitor. A switch contact on the Willis coupler is provided for this purpose.

As far as the design of a typical linear is concerned, all that remains to be considered is a few minor components. With reference to Fig 1, consider each in turn.

RFC1

This is the HT choke. No matter what the rest of the design is, this choke will be almost invariant. It needs the following properties. It must have a reactive impedance which is high compared with the plate impedance on all bands, it must be able to carry the DC plate current without resistive loss, and it must be able to withstand several thousand volts of RF longitudinally.

Many designs have appeared for this choke in varying complexities, since there is one problem. That is that the self resonance of a coil wound for a high impedance at 3.5 MHz is likely to lie in the area 10 to 30 MHz. Now it is important that the self resonance frequency is not near any of the Amateur Bands, and systems of staggered winding pitches, varying diameters, and combinations have all been

tried with success. However, even the simplest design does work. A piece of ¾ inch diameter Teflon close wound with 24 SWG high quality enamel wire for a length of 3¼ inches, self resonates at 17 MHz as determined with a GDO. There is nothing magic about those dimensions, they were just a guess. At all events, this choke has been satisfactory on all bands without heating. (Turn power *off* and make sure that the HT is discharged before feeling how hot the choke is!)

C1

This is the very important DC blocking capacitor. To provide maximum coupling it must have a low series impedance at all operating frequencies. The performance at 3.5 MHz requires that the capacity must be greater than about 1000 pF and the heating performance at 30 MHz requires that the capacitor type must be a low loss coaxial ceramic type. The fact that the HT is about 3000 Volts or so demands that the voltage rating should be well in excess of this figure. Since the matter of safety also comes into this, it is suggested that a working voltage rating of 7.5 kV DC or better be chosen. Capacitors similar to those manufactured by Centralab (Series 850S) are suitable.

C2

A 1000 pF 5 kV mica will serve as an adequate bypass capacitor.

RFC2

This RFC serves two purposes. Firstly it provides a DC path to ground should the DC blocking capacitor fail, and secondly it provides a static drain to clear static build-up from the antenna which can fail the blocking capacitor.

A third use for this component was discovered at VK3AAR. The linear was being used into a dipole without a DC return path, with a Bird thruline wattmeter in circuit, and the application of the HT to the linear induced a sufficiently large pulse through the blocking capacitor (1800 pF) to destroy the diode in the wattmeter element. Fitting the choke removed the problem. The size of this choke is not important and about 1 mH is adequate. However, the wire size should be large enough to blow the main power fuse should the blocking capacitor fail. For example a 2 cm ferrite ring wound with a single layer of 24 SWG enamel wire works adequately.

APC

The Anti Parasitic Choke will be a composition type carbon resistor about 50 to 100 ohms, "Shorted" by about 2 or 3 turns of 16 SWG tinned copper wire. One will be required in each anode lead. This choke suppresses VHF spurious emissions.

Grid and screen bypass capacitors will be 1000 pF disc ceramics or similar.

The only other component to be found in the linear where design is required is the heater choke required for the grounded grid amplifier. The size of this choke will be controlled by the filament current. An air choke to carry the 14 or so amps required by most tubes, having at the same time a high RF reactance compared with 300 ohms, would be quite a monster. Fortunately, we can resort to the use of ferrite once again. There seems little point in doing an absolute design, and the experience of others yields a unit that is easy and cheap to construct. An ordinary broadcast band ferrite rod about ½ inch diameter, bifilar wound with 20 turns of 16 SWG enamel wire, gets a little warm at 14 amps, but operates quite well.

Apart from a few practical aspects that become evident when the linear is being built, and which vary from unit to unit, the above covers the general design of the amplifier part of the linear. Jumping the gun a little, and considering the final construction, it is possible to build a satisfactory linear with no input matching circuit, no screen supply, and no bias supply. The final circuit will be as shown in Fig 8. This would appear to be the simplest circuit that I could build within the components that I had available. There is nothing unusual or novel about this circuit, but under test it does deliver 400 watts PEP on all bands using a 2-tone test into a 50 ohm dummy load, with a minimum of fuss.

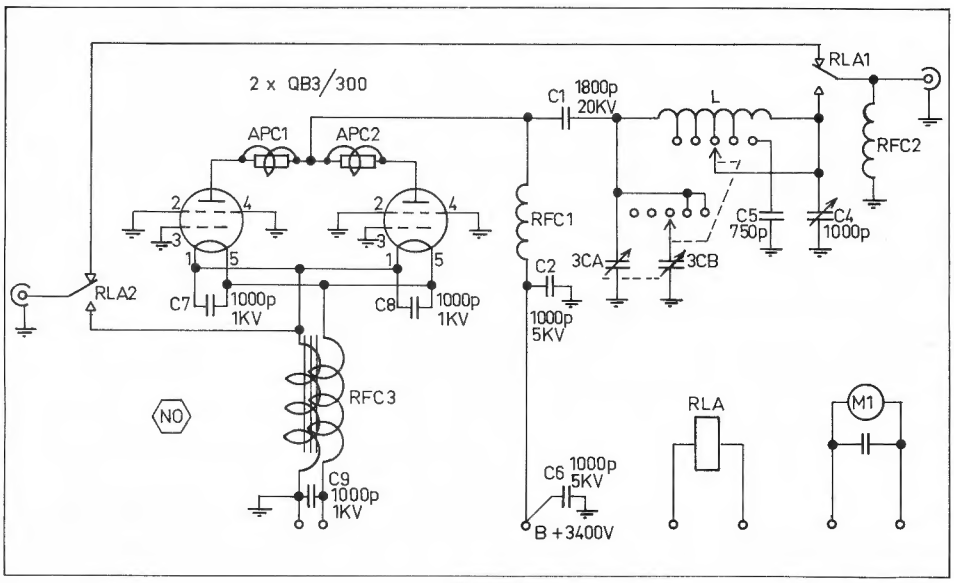


FIGURE 8

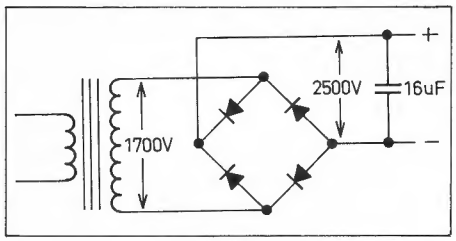


FIGURE 9

Whilst not part of the linear amplifier itself, the design of a power supply is worth more than a passing mention. We have already established that we need between 1000 and 4000 Volts, at currents that we can deduce to be between 1 Amp peak at 1000 Volts and 250 mA peak at 4000 Volts. Under misalignment the peak currents may be twice these figures. The average currents will be about half the above currents.

However, over a period of several hours, the mean energy required from the power supply will be quite low. This raises several problems with regard to just how large the power supply components need to be. Again there is no single solution to the problem. The simple alternative of RF speech processing or not changes the power supply size by some 20 to 30% when processing is used.

For the home brewer the power supply is likely to be the most expensive item, particularly if he does not already have a power transformer and filter components. So it is well worthwhile examining the design of the power supply in some detail, if only to avoid expensive mistakes. As in the case of the linear amplifier itself, let us establish the requirements of the supply.

Input power: 240 V AC single phase.

Output Voltage: Let us consider an average of 2500 Volts.

Output Current: Syllabic maximum: 500 mA.

Average (5 minutes): 350 mA (speech Processed), 250 mA (unprocessed).
Average (1 hour): 150 mA (speech processed), 110 mA (unprocessed).

Ripple at 500 mA: Better than 3%.

Regulation: From zero current to syllabic maximum: 10%.

Subsidiary supplies: Filaments: 5 Volts at 15 Amps; Relay supply: 24 Volts DC at 500 mA.

Metering: Plate current, 0 to 500 mA. Plate voltage, 0 to 3000 Volts.

The justification for setting the above targets rests with experience and the accepted practices. Certainly the average current ranges will vary somewhat from operator to operator, so it will not be unreasonable if we consider the worst conditions in the following treatment. The individual may choose for himself if he wishes to cut down on the design.

Both at the commercial and home brew levels, the design of power supplies varies

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VHF

ONLY $189.00

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Crystals normally available for the Multi 7 include repeater and anti repeater 1, 2, 3, 4, 5, 6 and simplex channels 40, 50 and 52.

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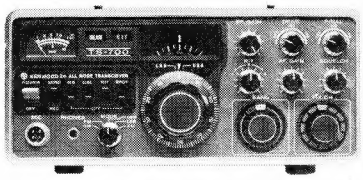
TS-700A TRANSCEIVER $645



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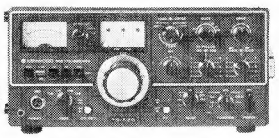
TS-700 All-Mode Transceiver is for 2-M operation and is equipped for SSB, FM, CW and AM. Features sending and receiving capability on 22 channels with 11 crystals from 144 MHz to 148 MHz. Rugged final stages are fully capable of sustained operation. This results from maximum-performance transistorization throughout. Has Noise reflector type squelch circuitry. AC/DC capability, and dual tuning mechanism with bandspread for maximum convenience. Performance is further highlighted by noise blanker, amplified type AGC circuitry, dependable S-meter, and built-in marker oscillator.

Specifications:
Frequency range: 144 MHz—148 MHz. Mode SSB, FM, CW, AM. RF power output: SSB, CW & FM—10 watts. AM—3 watts. IF frequencies: 1st IF—10.7 MHz; 2nd IF — 455 KHz Receiver sensitivity: SSB & CW—0.5μV input for 10 dB S/N, FM—1μV input for 26dB S/N, AM—2μV input for 10dB S/N Selectivity SSB, CW & AM—4.8 kHz (at —60 dB), FM—40 kHz (at —50dB) Frequency stability: ±4 kHz from 1 minute to 60 minutes after switching on; thereafter, 200 Hz per 30 minutes of operation. Dimensions: 278Wx124Hx320D mm. Weight: 11 kg. Equipment provided: 500 ohm dynamic microphone (1); 2 ampere and 5 ampere fuses (one each); extension speaker plug (1); auxiliary feet (2); pin-type plugs (2); AC cord (1); DC cable (1); decals sheet (1).

Cat. D-3100 .. .. $645.00

TS-520 TRANSCEIVER $570



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Specifications:

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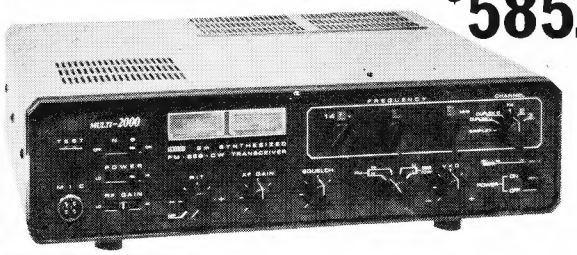
Mode:	USB, LSB, CW
Carrier Suppression:	40dB
Unwanted Sideband Suppression:	40dB
Sensitivity:	High impedance (50kΩ) 0.5μV for 10dB (S+N)/N on 80 to 15 meter band, 1.0μV for 10dB (S+N)/N on 10 meter band.
Selectivity:	SSB; 2.4 kHz (—6dB), 4.4 kHz (—60dB), CW; 0.5 kHz (—6dB), 1.5 kHz (—60dB) (with optional CW filter)
Frequency Stability:	100 Hz per 30 minutes after warm-up
Power Requirements:	120/220 VAC, 50/60 Hz 12VDC
Dimensions:	333Wx150Hx335D mm
Weight:	16 kg.

Cat. D-2520 .. .. $570

MULTI-2000 SSB/FM/CW TRANSCEIVER $585.



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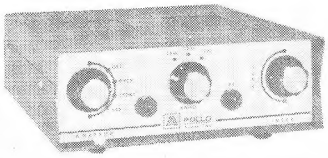

100 watts input on AM with 2-5 watts drive. Front panel selection of 15 M band, 10/11 M. or 6 M bands. Automatic keying delay for SSB. No internal wiring of transceiver required. No internal tuning controls. Stand-by position on selector switch. Transistorized automatic RF Keyer built in. Compact heavy gauge steel cabinet. Operates from 12V Draws 15 Amp max on SSB peaks. Weight: 8 lbs.
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* *Max power 10 watts and 30 watts p.e.p. SSB from as little as 100mw input (and suitable 100mw - 3 Watts)*
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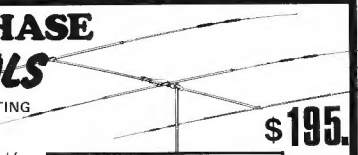

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Front-to-Back Ratio	25db
Maximum Power Input	1 KW, AM
VSWR (at resonance)	Less than 2:1
Impedance	52 ohms
MECHANICAL	
Longest Element	27 ft.
Boom Length	14 ft.
Turning Radius	15.7 ft.
Wind Load At 80 MPH	103.7 lbs.
Maximum Wind Survival	100 MPH
Net Weight	36 lbs.
Mast Diameter	1¼" to 2½"
Surface Area	4.03 sq. ft.

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Use with transceiver up to 80 watts PEP.
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greatly, and particularly if you have certain major components, you are quite justified in copying an established circuit. Let us consider the pros and cons of some of the more usual power supply configurations.

FULL WAVE WITH A PAIR OF 866s AND CHOKE INPUT

This circuit is the traditional one. Its advantages are that the regulation is very good, the current in the rectifier tubes is kept as low as possible and high value capacitors are not required. Against it are the higher transformer voltage, the high bleed current and the large swinging choke that are required. The use of 866s would seem to be dubious in these days of semi-conductors.

VOLTAGE DOUBLER

This class of circuit is quite popular in the 1000 Volt output class. The power transformer is quite easy to make, high current rectifiers are cheap and available, and high value 600 Volt electrolytic capacitors are not over expensive. However, at higher voltages, electrolytic capacitors have to be cascaded to obtain the high working voltages needed. A general problem with doubler circuits is that the ripple and regulation is poorer with the same total capacity compared with a full wave circuit.

HALF WAVE RECTIFIER

This circuit has many of the problems of the voltage doubler circuit, and in these days of inexpensive solid state rectifiers, there is much to be gained by using a full wave bridge, using the same power transformer.

FULL WAVE BRIDGE

At voltages near the 2.5 kV that we are considering the full wave bridge has many advantages. It provides the best ripple performance obtainable with a single phase circuit and consequently minimizes the size of the filter components. In fact, for a linear amplifier, adequate filtering may be obtained with a single storage condenser. The disadvantage of this circuit is that a power transformer of high voltage output is required, and the output winding must be floating; that is no part of the winding may be connected to earth. This latter fact does present problems to the transformer designer.

With all this in mind, the logical choice for our linear power supply would be the full wave bridge, or if a suitable transformer is available, a conventional full wave two diode circuit. The best generally available method for power supply design is that detailed in the Radiotron Designers Handbook edited by Langford-Smith. For each circuit type that we have mentioned, plus a few others, curves are published from which the regulation, ripple and component ratings can be obtained for a given circuit. Conversely, given some of the parameters, the remainder can be deduced.

Using this design method for our general example we discover that the ripple requirement predominates and that a 16 uF single storage capacitor will suffice. Of course, it would be possible to use a

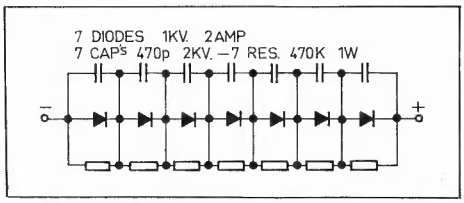

FIGURE 10

smaller input capacitor of 6.5 uF followed by a 10 henry filter choke followed by another filter condenser of 1 uF. My opinion is that these extra components are not necessary, and since the single condenser circuit improves the regulation from 10 to 7%, the larger value is to be preferred. So the rectifier circuit becomes that shown in Fig 9.

Since we are using a condenser input filter, the required transformer secondary voltage is the output required DC divided by the square root of 2, which works out to be 1770 Volts. The storage condenser will need to be rated for a working voltage of something greater than 2500 V DC. The fortunate amongst us will reach into the junk box and find a 16 uF 8500 V DC paper capacitor weighing about 10 kilos, as I did, the rest might find kind friends or be forced to "manufacture" such a unit from several electrolytics fitted with balancing resistors.

Continuing with the design method we discover several more important design parameters. Each of the four diode legs will have an average current of about 250 mA, a repetitive peak of about 5.5 Amps and probably a turn on surge current of about 30 Amps. It is quite easy to see why simple circuits like this were not used in the days of valve rectifiers. Even now, some care will have to be taken in the choice of diodes. Using a factor of safety of 2.6 for PIV, a figure which is satisfactory for unprotected circuits, each leg will have to be rated at more than 6500 peak inverse volts. Following the usual practice, each leg could consist of 7 diodes each rated at 1 or preferably 2 Amps average forward current and 1000 volts reverse, connected in series, each diode having a 470 pF 2 kV disc ceramic condenser and a 470 K 1 W resistor in parallel across it. So each leg will look like Fig 10. There is little point in saving pennies in the diode department, and the above calculations are based on the syllabic current.

The power transformer does not have to work this hard. Diodes heat up quickly, but transformers take some time due to their mass. Hence, the transformer need only be rated at something like the 1 hour average.

Considering the speech processed case, the average DC output is 150 mA, which means that the transformer will have to be rated at something like 230 mA RMS, or 400 VA continuous. For this sort of service the expression IVS or intermittent voice service is used. The IVS rating for the transformer we have just described is about 1350 VA IVS. It sounds better anyway. All the same it is a fairly lusty transformer, and one which you would prefer to buy at disposal prices.

Two other supplies are required, the filament and relay voltages. The filament supply may be obtained from a separate filament transformer, or if there is room on the main transformer, sufficient turns of a suitable gauge wire may be added to obtain the correct filament voltage. Much the same can be said of the relay supply. In the case of my own unit the main transformer provides the HT and filament windings, whilst a small 18 Volts aside transformer raises 24 volts DC by means of a couple of diodes and a 1000 uF 30 V electrolytic. These fine details will depend very much on the size of the junk box.

A suitable power supply circuit for the linear amplifier of Fig 8 is shown in Fig 11. A conventional voltage divider and shunt is used to adjust a meter to read supply voltage mounted on the supply chassis, while a 1 ohm shunt and adjust-

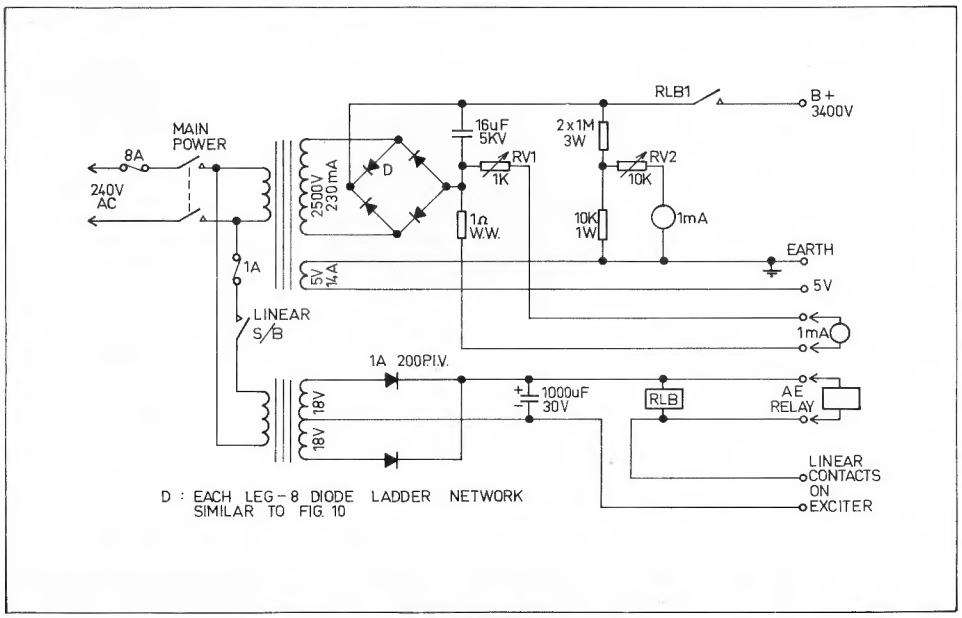

FIGURE 11

able multiplier operates a remote meter mounted on the linear chassis indicating anode current. Note that this arrangement does not permit the high voltage to be applied directly to the meter movements. During receive ,the HT must be removed from the anodes to avoid noise and possible receiver destruction should the final take off. A long throw circuit breaker RLB connected in parallel with the aerial changeover relay RLA removes all but the filament power from the linear chassis.

There are alternative methods for removing the HT from the tubes. Opening the cathodes with a smaller circuit breaker will bias the tubes hard off, but will leave the anodes high with respect to ground. Removing the 240 Volt power from the transformer, or opening the high voltage secondary will all kill the HT, but will introduce the problem of high surge currents each time the press to talk or vox operates.

This concludes the electrical design of the linear and power supply. A design has been deduced that is as simple as possible, using a minimum of components at what should be a low total cost, certainly less than a completed commercial amplifier. The only design parameter that we have relaxed is the input impedance, which we could modify should we wish to do so. Probably the only facet of the overall design that we have not covered is the mechanical layout. A few general comments can be made, but the choice of tubes possible and the range of parts that may be available to the constructor, makes a general mechanical layout impossible. My feelings on general details are as follows:

I consider that the power supply should be enclosed in such a way that the high voltage components may only be touched with difficulty, and this must include abuse by any person. Ventilation holes should be small and even covered with a fine mesh. The use of a suitably large transformer and solid state rectifiers may permit a completely closed box. An adequate power earth should be provided through the input power cable. This prompts an interesting detail. A problem that is observed by many linear operators is the syllabic modulation of the power mains. It is not unusual for an exciter and linear combination to pull current from the mains varying from half an Amp to about 8 Amps. This causes lights to flicker, VFOs to drift and all sorts of associated problems at a syllabic rate. So it might be necessary to power the linear from a different power circuit. Operators with shacks remote from the domestic power board, may have to run a second power feed to the shack. Even with normal supply regulation, a variation of about 5 to 10 volts is quite possible on the 240 volt mains.

The linear amplifier itself should be well screened, and at the same time well ventilated. The use of perforated or expanded metal achieves both these aims. As well as a coaxial earth to the exciter, a separate earth to the exciter using a length of recovered coax outer will help to reduce RF feedback. In operation, the increased quantity of RF around the shack due to high transmitter output may increase the possibility of RF feedback in general. The usual treatment of improved earthing, removal of RF current on coax outers, and general shielding will correct the problem. So, a little elementary design, a little construction, and you too can say . . . "An FT101E into a homebrew linear running the legal limit". (Next month the author describes his success in building a 400 W PEP linear covering 80 through 10). ■

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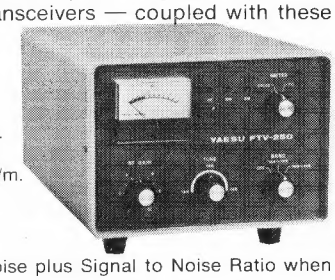

Technical Data

GENERAL
Frequency Range: 144-148MHz.
Mode: SSB, AM, CW and FM.
Size: 210(W) x 153(H) x 285(D) m/m.
Weight: 6kg.

RECEIVER
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Weight: 4kg.

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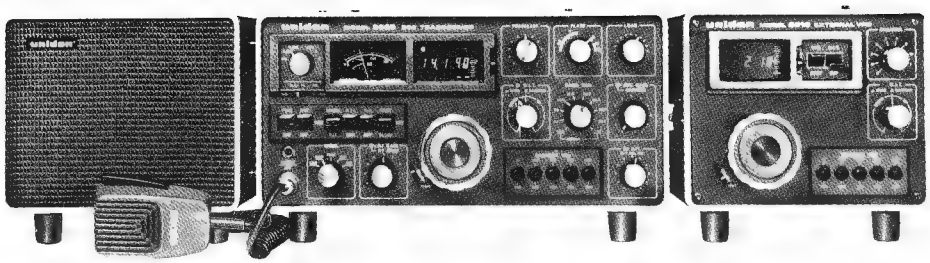
AN AR SPECIAL

A REVIEW OF THE UNIDEN 2020 HF TRANSCEIVER



The Uniden 2020 with matching speaker and external VFO.

To those of us who started out in amateur radio in the immediate post war days and were brought up on such names as Hallicrafters, National, Johnson and Collins, the new crop of Japanese amateur equipment manufacturers seem strange indeed. However, as time passes, no doubt many of these new names will be just as famous and synonymous with our hobby.

Uniden is perhaps the most recent addition to the amateur vocabulary.

In actual fact, Uniden have been producing high grade commercial communications gear for some years now and whilst the 2020 represents their first attempt at the amateur market, it is backed by this experience and obviously a keen know-how of amateur requirements.

TECHNICAL FEATURES

The 2020 is a five band transceiver that covers the 80, 40, 20 and 15 metre bands with 500 kHz coverage on each band.

The ten metre band is covered in four steps of 500 kHz each to give a total coverage of 28.0 to 30 MHz. The eleven metre band is also included with 27.0 to 27.5 MHz coverage. While the Japanese models provide receive only facilities on this band, all 2020's sold in Australia have transmit function on this band. A receive only band from 15.0 to 15.5 MHz is included for reception on WWV and also a few short wave broadcast stations.

Operation is provided for USB, LSB, CW and AM. Separate filters are included for upper and lower sideband which allows for change of sideband without frequency shift. These filters have a nominal bandpass of 2.4 kHz at —6 dB. Also included as standard is a 600 Hz CW filter.

Perhaps the most unusual feature of the Uniden is the tuning system. Instead of covering the full 500 kHz in one sweep as is usual these days, there are five, push-button selected, 100 kHz segments. This enables the operator to shift from one end of the band to the other by simply pressing the appropriate button. The frequency generation system associated with this tuning method employs the advanced phase locked loop technique.

Rather than take up space here, I would refer readers to page 16 of November 1975 Amateur Radio for a full description of the operation of this system. The PLL circuit is claimed to improve frequency stability over that obtained with a more normal set up. Just how this works out will be discussed later.

Another unusual feature of the Uniden is the dial readout, which is a combination of digital by LEDs for the Megahertz and one hundred kilohertz segments, while the hertz and tens of hertz are displayed on a rotating drum dial with calibrations drawn to imitate the LED readout of the first portion of the dial. Even the red colour of the LEDs has been perfectly matched.

The Uniden 2020 has all the normally expected features of a modern transceiver. It will operate from AC mains from 110 to 240 volts as well as from 12 volts DC. It has receiver offset tuning but once again the Uniden does it with a slight twist. Two tuning ranges are provided, one with ±5 kHz and the second with ±1 kHz. The bandspread RIT is selected with a pull-on switch on the offset control.

A cooling fan for the final stages is another part of the standard equipment, as is a three position AGC selector for fast, slow or off. A noise blanker and a built-in monitor loudspeaker are included. Needless to say, the Uniden is all solid state except for the transmitter driver and final stages which use a 12BY7 and two 6146B tubes respectively. 52 transistors, 16 FETs, 18 ICs and 154 diodes are employed in the solid state sections.

All this adds up to a very complex piece of gear and there are surely more components per dollar paid out than any other piece of gear available on the market today. It will of course be interesting to see how reliable the Uniden proves to be after a few years of operation.

Obviously, with such a complex circuit, a good deal of space could be taken up with descriptions of each and every part of the transceiver, but I think most readers will be more interested in how the transceiver handles, how it sounds, and what happens when the knobs are turned.

THE UNIDEN 2020 ON THE AIR

In appearance the 2020 is quite different to any of its competitors. It is also rather large by current standards. It measures 350 mm wide by 165 mm high by 333 mm deep and weighs in at 39.6 pounds or 18 kg. It might therefore be hard to fit into the average family car if mobile operation is required, and would represent quite an effort to lift off the operating table into the car and return. However, most amateurs will probably be using the Uniden as a fixed station only. Incidentally, when running from 12 volts DC, the standby curren drain is 7 amps with 22 amps peak at full SSB output.

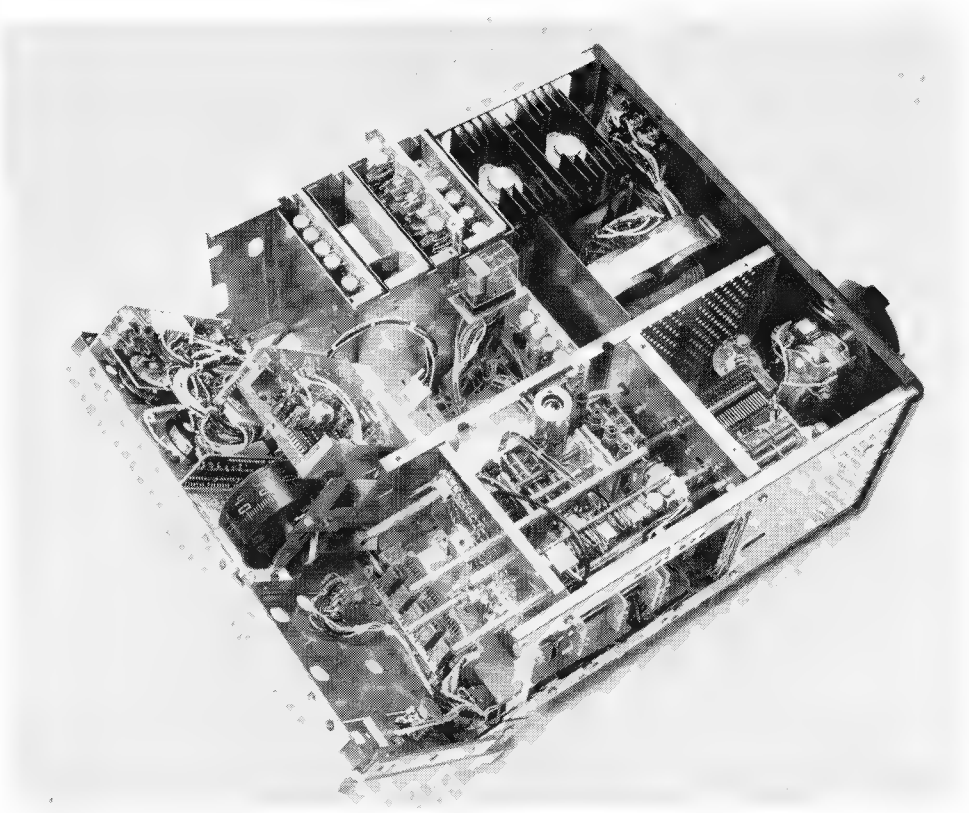
The 'S' meter, which also reads ALC voltage, cathode current, and relative RF output when in the transmit mode, must be the clearest meter on any piece of amateur gear on the market today. It has a predominantly bright green scale with a red needle that stands out with remarkable clarity. The meter movement is well damped and average readings can be taken without any eye strain at all.

The tuning system of the 2020 proved a little disappointing. Firstly, the tuning knob is much too big. One about fifteen millimetres smaller in diameter would be much easier to turn. It also seems an odd omission that a spinner handle has not been provided. The 100 kHz tuning range could also come in for some criticism. It seems that the designers of the 2020 set out to prove Murphy's Law. That is, that the station you want to listen to is just outside the range of that particular segment.

If you like to tune up and down the band it is amazing how often this happens. But, speaking to many owners of the Uniden, the majority put the tuning system on the top of their best-liked features list.

Calibration points on the kilohertz dial are spaced about 1.5 mm apart and the pointer, which can be adjusted vertically to achieve zero set, is illuminated to give excellent contrast against the moving scale. Linarity of the kHz scale is quite good. It checked out to within 500 Hz over the full range.

The crystal calibrator works with rather an unusual system. Instead of using a 100 kHz crystal as is normal these days, a 6.4 MHz crystal, with a multi-vibrator to divide down to 25 kHz is employed. Though unusual, it appeared to work somewhat better than the older 100 kHz system with regard to stability. However, the strength of the 25 kHz points on the various tuning ranges was rather low and in fact often hard to find at all amongst the QRM on 80 and 40 metres. An average of 'S' 8 was obtained with the lowest reading on 80, and the highest of just over S9 on 10 metres.



This exploded view of the 2020 shows many of the components and the facility of swinging out the front panel for easy access.

Switching from band to band produced no more than a 500 Hz change in the dial calibration point.

Another feature of the tuning system is a tightness control for the knob. This enables the tension to be controlled up to the point of actually locking the knob; quite a handy feature for mobile operation.

One last comment on the tuning dial is that if the transceiver is used in a position with direct sunlight falling on the front panel, the readout becomes very hard to see. Unfortunately this is one of the problems that has to be accepted with LED readouts and there does not seem to be any easy solution.

The dual speed offset tuning proved to be a delight to use. The ± one kHz range was ideal for setting an SSB signal spot on. A separate switch is provided for the RIT and a small and rather dull LED above the control indicates operation of this.

Frequency stability was next checked out. The published specification is rather vague, stating *'Less than 300 Hz drift in starting. Less than 100 Hz drift or less after 30 minutes of warm up'*. This would seem to indicate that no more than 400 Hz drift could occur over all. In fact, over an eight hour period, the 2020 drifted 1400 Hz. If the specification is interpreted as meaning 100 Hz drift per hour after warm up, then this would be just met.

The above is not implying that this amount of drift is in any way unsatisfactory. For the average amateur using the 2020 for two or three hours, the total drift would be very small and go unnoticed. However considering the complex system of frequency generation, the Uniden does little better in regard to stability than any other modern transceiver.

The action of the noise blanker was disappointing. It did reduce the level of car ignition noise to some extent and proved useful in weak signal copy through this type of interference. On all other types of noise such as electrical appliances and power line noise, no noticeable improvement could be detected. As far as could be seen there is no adjustment to increase the blanking action.

One of the small but nice features on the 2020 is the inclusion of a tip-ring and sleeve headphone socket. This enables the use of the common and cheap stereo type headphones available from supermarkets and discount shops. An attenuator is also included to bring the audio level to the right point.

On receive the Uniden proved a most pleasant set to listen to. Audio quality from the built-in speaker, which is set into the bottom cover of the cabinet, was very well balanced. It produced a full, round tone that is often lacking with these small speaker units. The overall good quality was assisted by a first rate AGC system. Several owners suggested that the slow AGC position could have been a bit slower, but after listening for several lengthy periods no strain or fatigue was encountered. Whilst no actual measurements were taken it was obvious that both the product detector and audio output section were working with very low distortion.

A point of criticism is the cooling fan. Reading the advertising on the 2020 the impression is gained that the fan switches off when the transmitter heaters are off. This does not occur. It is possible to switch the fan off in the receive mode but to do this it is necessary to reach behind the set and push the *'RF power AMP'* switch to the off position. This is normally actuated when a transverter is connected. To make matters worse, the fan is by no means silent. It produces a good deal of low frequency rumble. The actual fan mounting seems to be the culprit as the motor noise is transmitted through the cabinet which sets up a resonant effect.

On transmit, the Uniden proved to be a very smooth performer. Power output was checked at 110 watts on 80, 40 and 20 metres with 100 and 95 watts on 15 and 10 metres. This was in the CW position with PEP output on SSB essentially the same. The transmitted wave form as viewed on a Heath SB610 monitor scope was extremely clean. No doubt this can be attributed to the regulated screen voltage on the 6146B finals. The AM output is double sideband and the transmitted signal was of good quality. Power output on AM averaged about 35 watts. Double sideband AM reception is not possible with the 2020.

VOX operation on SSB was very smooth. There is no audible clicking or plopping through the speaker and only a very subdued sound from the relay. Those who are consistent VOX operators may find the delay a little long even when set to the shortest position. It would seem that this could be modified with little trouble.

ACCESSORIES

The Uniden is supplied with a very complete set of accessory plugs and connectors. These include a good quality PTT dynamic microphone with curly-cord and four pin screw-on connector. A spare microphone connector is also included for use with your favourite mike. In addition to this you receive a PL259 antenna plug, several RCA plugs, headphone and key plugs, 3.5 mm plug for an external speaker, plus spare fuses, and extra cabinet feet to raise the front of the transceiver.

The instruction book is very well produced. Actual operating data is complete and well illustrated. As is usual these days, no alignment data is included and trouble shooting is assumed to be the dealers problem rather than the individual amateur. However, if you are game, there is an excellent illustration of each circuit board showing every part clearly.

There is a full range of external accessories available for the Uniden 2020. These include an external VFO and matching external loud speaker. The unit used in our test report was supplied by Vicom International of 139 Auburn Road, Auburn, Victoria, and information regarding price and delivery of the Uniden 2020 and its external accessory units should be addressed to them, or to their Sydney branch at 23 Whiting Street, Artarmon. ■

NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

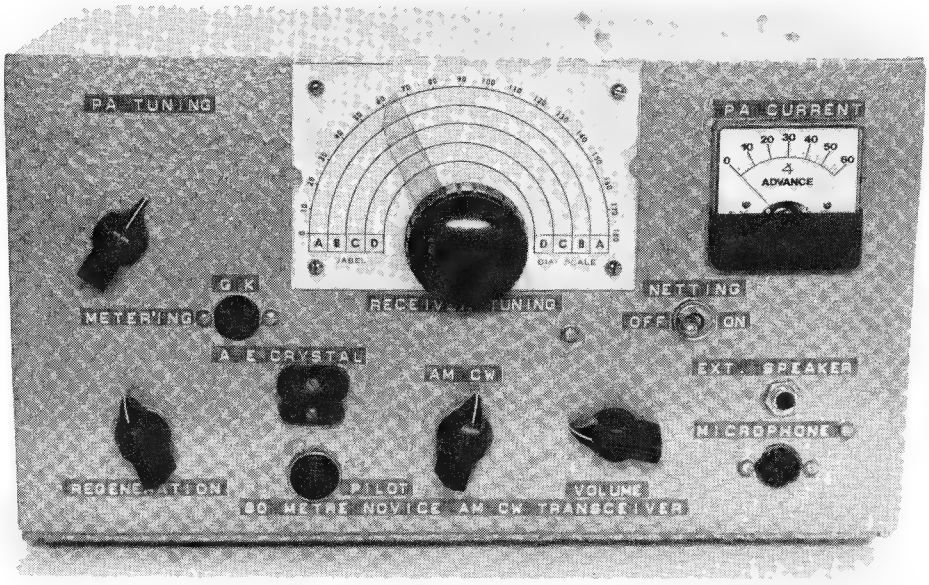
AN 80 METRE NOVICE RECEIVER — PART 1

The receiver has proved to be a lengthy project trying to obtain the two conflicting requirements of good performance with simplicity of design. The receiver is sensitive — any signal worth listening to on a Yaesu Musen FR-100B receiver is quite readable on the Novice receiver.

The selectivity is not as good as the FR-100B but is quite reasonable when it is considered that the parts for this receiver cost about the same as a good crystal or mechanical filter. It is quite stable as regards tuning stability and is a very effective monitor receiver for the companion transmitter. This means that it can handle a very strong signal without overloading, and is capable of receiving AM/CW/SSB/FM transmission modes over the frequency range 3.5 to 3.85 MHz.

It is the intention of this series of articles to form both an instructional and constructional series for those who want a simple but effective receiver and those who want some tuition towards an Amateur Exam. This month the circuit diagram of the receiver will be presented along with a detailed parts list. A detailed description of the receiver operation will commence next month.

The receiver is mounted on the same chassis as the previously described transmitter (although it can be mounted on a separate chassis if desired). The above chassis layout is shown in Fig 1 of December 75 AR. However, since that diagram was drawn, a 455 kHz IF transformer has been mounted between V4 and V5. V7, a voltage regulator, is mounted in any convenient spot on the chassis. R72 the monitor level control is mounted just above the metering socket shown on Fig 2 of December 75 AR. Please note that STR2 is the same terminal strip shown in the circuit diagram of the transmitter in September 75 AR.



A front panel view of the novice transceiver described in this series of articles.

COMPONENT LIST FOR THE 80 METRE NOVICE RECEIVER

R50 — 16 K ohm 2 watt, or 2 X 33 K ohm 1 watt resistors in parallel. The value of this resistor depends on the supply voltage which in this particular case is about 360 V DC. The resistor is intended to drop the HT voltage to the heptode section of the frequency converter V4.

R51 — 47 ohm 1 watt, valve heater balancing resistor, equalises voltage drop across the series-parallel heater network. Can be deleted if the heaters are wired for parallel operation from 6 volts.

R52 — 5 to 22 ohms ½ watt, determines the amount of RF signal attenuation achieved when the moving arm of R53 is at the R52 end of its travel. It can be omitted which will mean that R53 can short circuit the aerial input coil.

R53 — 3 K ohm wire wound or carbon potentiometer. 3 K ohm is optimum but values between 2 K and 5 K ohm will be useable. It is used as an RF gain control by increasing the negative bias on pin 2 of V4 relative to the cathode pin 3.

R54 — 15 K ohm 1 watt, portion of a voltage divider supplying nominally 100 volts to pin 1 of V4 despite variations in current drain of the screen with variations in bias applied to the grid pin 2.

R55 — 18 K ohm 1 watt, portion of the voltage divider mentioned above. The current through this voltage divider also causes a voltage to be dropped across R53 which improves the RF gain control operation. R53 also forms portion of this voltage divider network across the HT supply.

R56 — 390 ohms ½ watt, cathode bias resistor for the heptode section of V4. This sets the minimum operating bias for the heptode, but not the triode, and allied with the screen voltage controls the maximum current drain of the heptode section.

R57 — 47 K ohm ½ watt, grid leak for oscillator section of V4.

R58 — 10 K ohm 1 watt, HT dropping resistor for the oscillator section of V4.

R59 — 10 K ohm wire wound potentiometer, used as the regeneration control of the regenerative detector stage. Varies the voltage on the screen of V5 which controls its gain and the point at which oscillation occurs.

R60 — 18 K ohm 1 watt, drops the voltage from the regulated 150 volt line to about 60 volts at the top end of the regeneration potentiometer.

R61 — 1 M ohm ½ watt, grid leak for the regenerative detector. Grid DC return to cathode.

R62 — 3.3 K ohm ½ watt, used purely as an RF attenuator so that RF would not be radiated about the chassis by the line to the regeneration control. The value is not critical and may be left out in some cases.

R63 — 100 K ohm ½ watt, plate load resistor for V5, audio voltages are developed across this resistor.

R64 — 0.47 M ohm ½ watt, grid return for V6a, audio voltages are developed across this resistor by the action of C68, R63 and the operation of V5.

R65 — 100 K ohm ½ watt, used as a grid stopper but in conjunction with C69 forms part of the audio top cut filter.

R66 — 2.8 K ohm 2 watt (2 x 5.6 K ohm 1 watt in parallel), HT voltage dropping and decoupling resistor.

R67 — 2.2 K ohm ½ watt, cathode bias resistor for V6a.

R68 — 47 K ohm ½ watt, plate load resistor for V6a, same function as R63.

R69 — 0.47 M ohm ½ watt, grid return for V6b, audio voltages are developed across this resistor by the action of C72, R68 and the operation of V6b.

R70 — 100 K ohm ½ watt, used as a grid stopper, but in conjunction with C73 forms part of an audio low pass filter. Operation the same as R65.

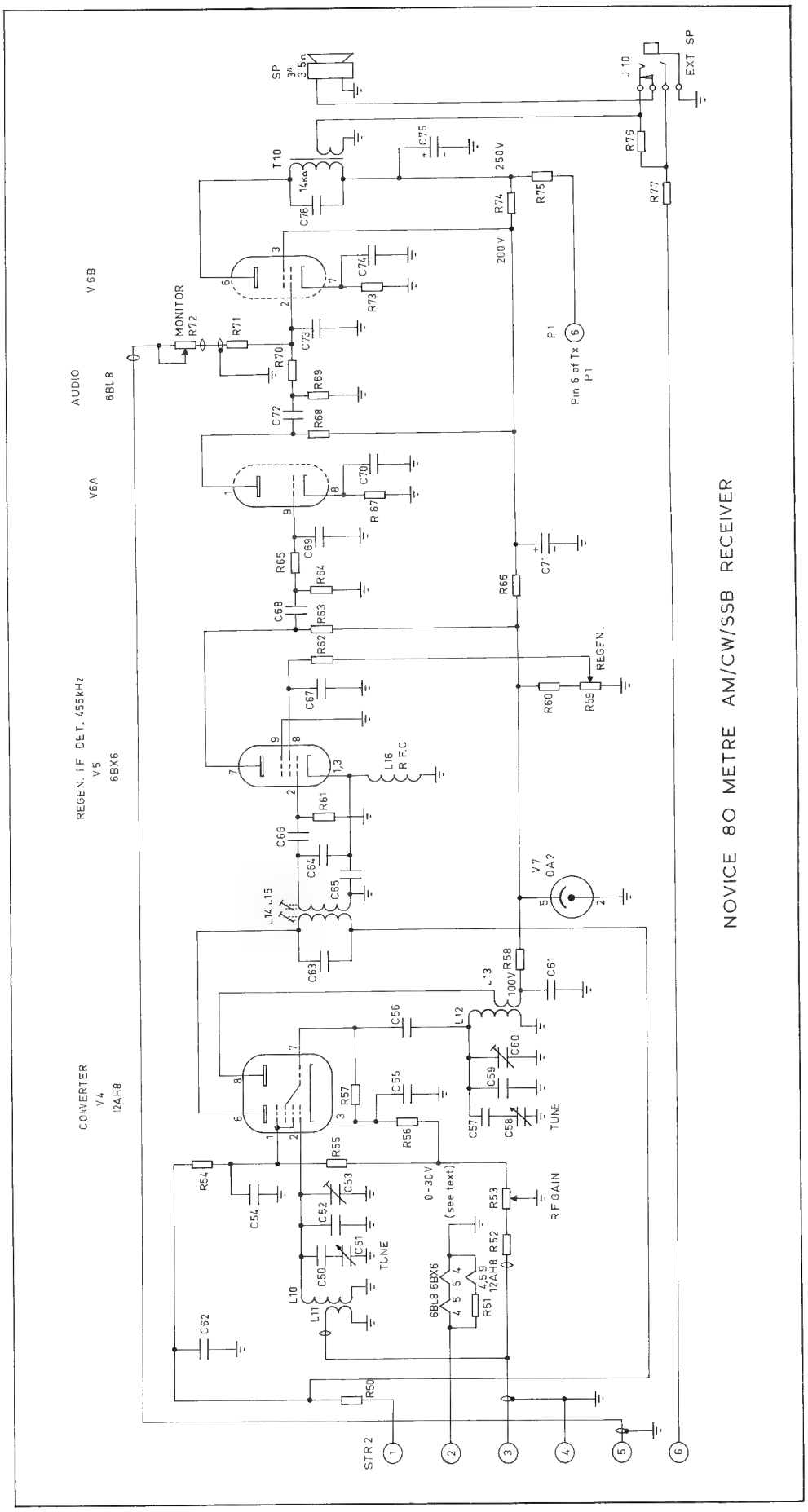
R71 — 2.7 K ohm ½ watt, used in monitor circuit to set minimum monitor level. Can be omitted if the monitor facility is not required.

R72 — 100 K ohm carbon linear or log type potentiometer, used to control the receiver audio output level when the receiver is used for monitoring purposes.

R73 — 330 ohms ½ watt, cathode bias resistor for V6b, in conjunction with the screen voltage sets the DC current drain of the valve.

R74 — 2.2 K ohm 2 watt (1 K and 1.2 K ohm in series), HT voltage dropping and decoupling resistor.

R75 — 3.5 K to 4 K ohm 5 watt wire wound resistor, used to drop the available power supply voltage down to 250 volts from 360 volts in this case. The value of this resistor will vary with different supply voltages, being higher if your supply is above 360 V and zero if supply is 250 volts.



R76 — 50 to 150 ohms ½ watt, drops level of output to a level acceptable for headphones, determined by experiment.

R77 — 150 ohm, originally used for monitoring purposes coming from the modulation choke in the transmitter. Redundant now as receiver monitors the transmitter RF signal direct, but useful if receiver is not being built and the transmitter audio is being monitored direct.

C50 — 92 pF mica or styroseal, used in series with C51 to get Aerial and Oscillator circuits to track 455 kHz apart. Controls the maximum effective capacity of C51.

C51 — 10-415 pF tuning gang, one gang of a twin gang capacitor. The aerial coil tuning capacitor.

C52 — 250 pF mica or styroseal, acts as a band set capacitor, selects approximately the portion of the radio spectrum tuned by the receiver.

C53 — 3 to 30 pF trimmer capacitor, used to peak the tuning of the aerial tune circuit.

C54 — 0.01 uF 400 volt polyester, RF screen bypass capacitor for V4.

C55 — 0.0047 uF 100 volt green cap or polyester, RF cathode bypass for the heptode section of V4.

C56 — 47 pF mica or styroseal, local oscillator section of V4 coupling capacitor from the tuned circuit to the oscillator grid.

C57 — 68 pF mica or styroseal, used in series with C58 to set the maximum frequency range of oscillation of the receiver local oscillator, in this case from about 3.955 MHz to 4.305 MHz.

C58 — 10-415 pF tuning gang mechanically coupled with C51, tunes the oscillator from 3.955 MHz to 4.305 MHz.

C59 — 180 pF mica or styroseal, acts as a bandset capacitor.

C60 — 7 to 70 pF Philips or similar trimmer, used to fine adjust exact segment of the band tuned.

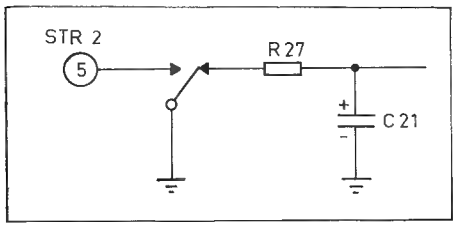
C61 — 0.022 uF 200 volt polyester, oscillator feedback coil RF bypass, plac bottom end of L13 at RF earth.

C62 — 0.022 uF 400 volt polyester, RF bypass to earth for V4 plate circuit.

C63 — 100 pF mica, tuning capacitor for L14 and is already built into the 455 kHz IF transformer.

C64 — 100 pF mica, tuning capacitor for L15 and is already built into the 455 kHz IF transformer.

C65 — 0.047 uF 200 volt polyester, used in conjunction with C64 to form an RF voltage divider at the junction of these two capacitors so that the regenerative detector can get RF feedback in the correct phase to produce oscillation when the valve gain is high enough.



Modified in modulator

VICOM

Cables & Telegrams "IZYCOM" Melbourne, Australia

Head Office & mail orders . . .
139 Auburn Rd, Auburn, Vic. 3123 Ph: (03) 82-5398
Sydney Branch . . . (Manager – Jack Gilham)
23 Whiting St, Artarmon, NSW 2064 Ph: (02) 439-1271

Prices and specifications subject to change without notice. Prices include Sales Tax but exclude freight and insurance. Allow 50c per $100, minimum $1.

HF TRANSCEIVERS

Uniden 2020 80-11M transceiver, complete	$570
Atlas 210/215X solid-state transceiver including noise blanker	$695
Atlas AR-230 AC power supply Atlas Delux mobile mount (DMK)	$ 55
Kenwood TS520 80-10M transceiver, complete	$598
Yaesu FT101E 160-10M transceiver, complete	$670
Yaesu FT75B mobile transceiver	$280
– FP75AC power supply – DC75DC power supply	$ 70 $ 75
Weston 27MHz transceiver, 5 watts AM	$135

LINEARS

Yaesu FL2100B hf linear	$430
QM-70 2M 50W rms	$105
OM-70 79cm 40W	$ 70

TEST GEAR

Yaesu YO-100 monitorscope	$205
Yaesu YC-355D frequency counter	$250

SPEECH COMPRESSORS

MC33A AC/DC includes two tone generator and in-built compression level meter	$62
MC22 AC/DC as above less meter	$ 49

NEW COUPLERS

CL666 Antenna Coupler 2.5kW, 1.8-28MHz, 0.3dB loss, heavy duty, superb quality	$235
CL66 Antenna Coupler 500W, 3.5-29MHz, 0.3dB loss, includes 4 pos coax switch	$ 98
CL99 Antenna Coupler 200W, 3.5-29MHz	$ 47

2m Fm

IC22A incl 6 chs, 12 month warranty	$219
IC215 portable, 6 chs, 12 month warranty	$160
DV-21 PLL VFO for IC22A	$285

ANTENNA ACCESSORIES

Vicom hydraulic 40' tower, fob Auburn	$570
HAM II heavy duty with control unit	$168
CD 44 medium duty with control unit	$135
8 core cable for rotators – 75c/metre	
Vicom VC-2 SWR/power meter, 3-150 MHz, up to 1000W pep, twin meters	$ 25
SWR200 swr/pwr meter to 2kW at 200 MHz	$ 49
Leader LPM885 swr/pwr meter	$ 78
ME-UA UHF pwr/swr meter to 15 watts	$ 69
AS-BL Balun	$ 18
AS-GM gutter clamp with cable and connectors	$ 10
RG 58AU coax cable 45c per metre	

2M ANTENNAS

LA 210N 10el stacked beam	$125
AS 210BN twin boom 18dB	$ 99
AS 210AN single boom 14.5dB	$ 38
ARX-2 6dB (Ringo Ranger)	$ 35
Lindenow 5/8 fibreglass for mobile	$ 26
M25 Scalar 5/8 fibreglass for mobile	$ 17

HF ANTENNAS

Midy HIN 40-10m	$ 38
Midy VN 80-10m	$ 44
AL 48DXN 40-80m	$ 38
AL 24DXN 20-40m	$ 28
14AVQ trap vertical 40-10m	$ 69

FOR THE NOVICE

Simple conversion instructions available for Uniden, TS-520, FT75B, FT101E to reduce power etc for novice licence requirements.

2m SSB

Introducing the new Trio-Kenwood TS700A 2m transceiver. It covers SSB/FM/AM/CW over 144-148 MHz. Introductory offer of $595 includes mic, English manual, plugs, cables and 90 day warranty.

VICOM FOR PERSONALISED SERVICE

Meet our Melbourne Branch crew . . .

Peter, VK3IZ Russell, VK3NT

MAL, VK3MW

DISTRIBUTORS:

Canberra:	Daicom 32 Kalgoorlie Crescent, Fisher. Phone: (062) 88-4899.
Adelaide:	Graham Stallard, 27 White Avenue, Lockleys. Phone: (08) 43-7981.
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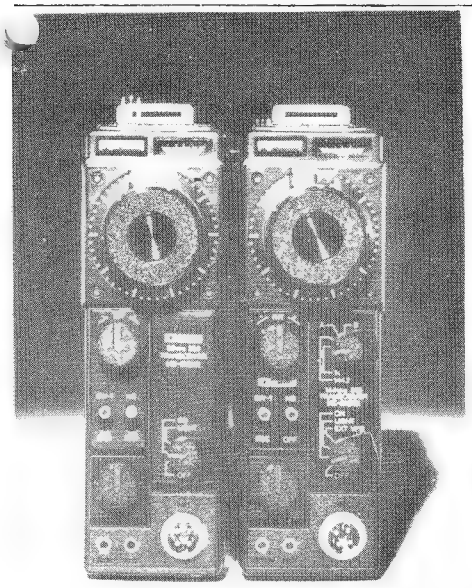
Perth:	Nstronics, 388 Huntriss Avenue, Woodlands. Phone: (092) 46-3232.



IC502 IC202

A FREE RIG EACH MONTH!

OFFER CONTINUES. Each month (until June 1976). VICOM will refund the purchase price of a quality IC202 or IC502 transceiver to one lucky customer who has purchased one of these rigs during the month!

IC202 – 2 metre portable – $210.
SSB/CW 3 watts with VXO operation. Provision for external antenna and power supply.

Comes complete with mic, carry-strap and dry cells together with –
* English manual ✓
* 12 month warranty ✓
* Factory backed spare parts. ✓

Winner of free rig - March: Mr J. Zmood, VK3ZAU, 1 Wrixen Ave, East Brighton

IC502 – 6 metre portable – $219.
Covers 52-54 MHz this fabulous portable runs both SSB and CW at 3 watts. Includes noise blanker, RIT control, UFO control and provision for external antenna and power. Comes complete with mic, carry-strap dry cells and of course, the VICOM 12 months warranty.

ACCESSORIES FOR THE PORTABLES

Note: Serial number required when ordering spares.

IC20L linear amp for 2M (10 watts)	$85
IC50L linear amp for 6m (10 watts)	$85
IC3PS matching power supply	$75
Telescopic Antennas for IC202	$1.95
Slow motion drive for IC202	$6.50
Desk Mic ICSM2	$34

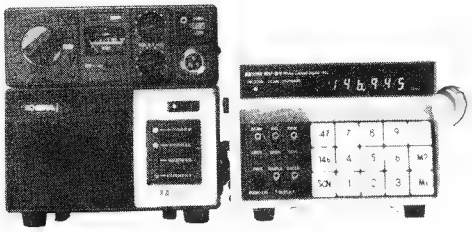
ICOM

VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM

the little surprise

The **IC-22A** has caused some pretty big surprises since it first started making waves in VHF-FM. Veteran operators have been delightfully surprised by its sophisticated styling and ease of operation; FM beginners, by its versatility, large number of possible channels, and its great value as a starter unit for FM transceiving; and all owners, by its unexcelled high quality construction and low maintenance problem record, ICOM traditions. The competition was in for a big surprise as it raced past everything in its field to become the most popular two meter crystal controlled radio on the market. Surprise Surprise.

But the **IC-22A**'s best surprise is the little surprise, its price. surprise. The little radio with all the big surprises is also the best FM transceiver value available. Engineered for versatility and sophistication: priced within the reach of the most modest beginner. Whether the **IC-22A** is your first FM or your last, you're in for a little surprise.



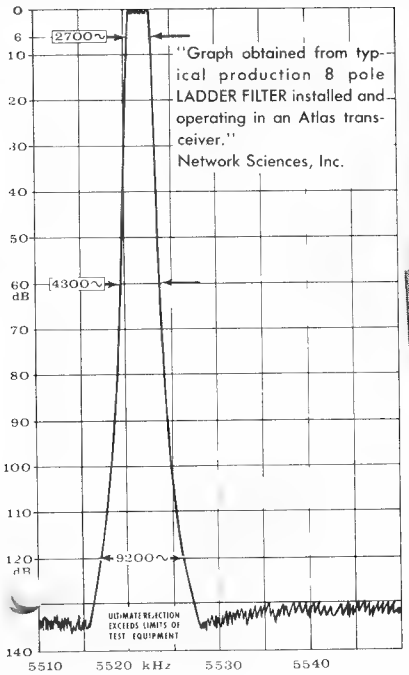
12 MONTH WARRANTY, TOO!

SEMICONDUCTORS	
TRANSISTORS	22
FET	4
IC	3
DIODES	16
FREQUENCY RANGE	146-148MHz
CHANNELS	22
MODULATION	Phase, F3
VOLTAGE	13.8 (15%)
SIZE	58x156x2305 (dim in MM)
WEIGHT	1 7 kilos

POWER OUTPUT	HI 10 Watts, LO 1 Watt
BANDWIDTH (TRANSMITTED)	15KHz with 5KHz deviation
MICROPHONE	DYNAMIC 500 Ohms
SENSITIVITY	4 microvolts for 20DB quieting 3 microvolts for 12DB SINAD
INTERMEDIATE FREQUENCIES	10 7MHz First I F 455KHz Second I F
MODULATION ACCEPTANCE	7KHz peak dev freq less than 3KHz
RECEIVER BANDWIDTH	+/ 13KHz more than 6DB + 23KHz more than 60DB
AUDIO POWER	1 Watt into 8 Ohms

ICOM

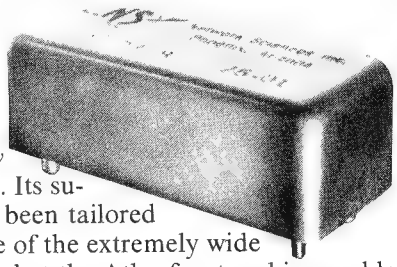
Comes complete with cables, mobile bracket, mic, English manual and 6 channels from the WIA Bandplan (extra xtals $9 pair).
Price: $219 including 12 month warranty.
All sets given pre-sales check out and as VICOM are the sole authorised Australasian Distributor a factory backed supply of spare parts and accessories is available.



Superior selectivity... maximum operating pleasure... You get both with the Atlas transceiver!

The selectivity curve above looks phenomenal, especially when compared with ordinary filters. What makes it even more phenomenal is that it is a *true* graph of the *overall* selectivity of the Atlas transceiver, not just a graph of a filter operating in a special test fixture under laboratory conditions.

THE SUPER SELECTIVITY of the Atlas transceivers is provided by an *8 pole crystal ladder* filter designed especially for Atlas by Bob Crawford of Network Sciences, Phoenix, Arizona. This filter represents *a major breakthrough in filter design with unprecedented skirt selectivity and ultimate rejection.* Its superior selectivity has been tailored to take full advantage of the extremely wide range of signal levels that the Atlas front end is capable of handling.



THE 6 db BANDWIDTH of 2700 cycles was purposely selected to provide audio response from 300 to 3000 cycles in both *transmit* and *receive* modes (it has been proven that transmission and reception of voice frequencies between 300 and 3000 cycles provides a substantial improvement in readability under noisy or weak signal conditions, as compared to narrower bandwidths). At the same time, the improvement in fidelity of voice communication is readily noticeable, and accounts for the constant reports of "broadcast quality" from Atlas transceivers. Unfortunately, many receivers with narrower bandwidths cannot fully appreciate the audio quality of the Atlas transmitter. It takes *2700 cycles of bandwidth* to get all of the quality, and the Atlas transceivers are among the few that have this ideal bandwidth.

SKIRT SELECTIVITY. The 8 pole ladder filter provides a bandwidth at 60 db down of only 4300 cycles (shape factor of 1.6) and a bandwidth of only 9200 cycles at 120 db down! No other filter that we know can even list their 120 db Bandwidth. Note that the Atlas filter is narrower at these levels than other filters, even though the others provide less bandwidth at 6 db.

ULTIMATE REJECTION is in excess of 130 db, greater than the measuring limits of most test equipment.

IT IS THIS EXTREMELY STEEP SKIRT SELECTIVITY, illustrated in the above graph, which rejects strong adjacent channel signals better than any other known receiver.

Combine this amazing selectivity with all the other features of the Atlas, such as: • Strong immunity to overload and cross modulation • All solid state design • 200 watts P.E.P. input • Total broadbanding with NO TRANSMITTER TUNING • Modular construction • Compact plug-in design (7 lbs, 3½" x 9½" x 9½"), and you quickly see why you get so much more operating pleasure with the Atlas 210x/215x.

210x or 215x	$635
With noise blanker installed	$695
AC Console 110/220V	$165
Model DD6 Digital Dial	$146
Plug-in Mobile kit	$55
10x Osc. less crystals	$65
Noise Blanker, for plug-in installation	$60

All rigs given thorough pre-sales checkout and are covered by VICOM 90-day warranty.
For complete details please drop us a line and we'll mail you a brochure.

PLUG-IN-AND-GO-POWER

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UNIDEN ..... the best value

CHECK THESE FEATURES:

WHY 11 GOOD FEATURES BECOME 11 GOOD REASONS WHY YOUR NEXT (OR FIRST) HF RIG SHOULD BE A "2020"

		UNIDEN 2020	BRAND A	BRAND B
1.	Air cooled final	Yes	Yes	Yes
2.	Transmitting tubes in final (6146B)	Yes	No	Yes
3.	CW filter as standard	Yes	No	No
4.	Regulated screen voltages for stable operation of final	Yes	No	No
5.	Independent rf circuits for Tx and Rx	Yes	No	No
6.	Dual RIT control 5kHZ or 1kHZ	Yes	No	No
7.	Slow/fast AGC switch	Yes	No	yes
8.	PLL VFO for excellent stability and tracking linearity	Yes	No	No
9.	Noise Blanker for pulse type noise	Yes	Yes	Yes
10.	Hybrid dial with digital analog read-out	Yes	No	No
11.	RF amp and fan switchable when receiving only — as desired	Yes	No	No

PRICE $570

SO WHAT's WITH THE PLL BIT?

We have taken an output frequency of 7MHz as an example and the relevant frequencies to eventually generate 7MHz are shown on the diagram.

1. The 9.138 MHz signal from the VFO is fed into the mixer in the PLL system. Here it is mixed with the 5.838 MHz signal from the VCO (voltage controlled oscillator) to produce an output frequency of 6.7MHz.
2. The 6.7MHz signal is passed to the programmable divider where it is divided by 67 to produce a 100 KHz signal which is passed to a phase detector (P/D).
3. In the phase detector the 100 KHz signal is compared with another 100 KHz signal derived from a highly stable 10MHz crystal oscillator.
4. The output from the P/D (an error voltage if one exists) is then fed back to the VCO to lock it precisely to 15.838 MHz.
5. This output of 15.838 MHz is fed to the local oscillator mixer where it is mixed with 29.025 MHz from the band oscillator circuit.
6. This produces a 13.187 MHz signal which is then fed to the transmitter or receiver mixer where it is mixed with the ssb signal generated at 6.187 MHz to produce the final output of 7MHz.
7. For other bands, a different band oscillator crystal is used, and to generate the 100 KHz segments within a band, the program on the divider is altered so that the divider's output is still 100 KHz.

Thus the 2020 has the stability of the 10MHz reference oscillator.

So much for the example given: of somewhat more practical interest is the sequence of events if the tuning knob (VFO) is turned — a reasonable state of affairs if we are going to tune the band! The following explanation also applies if the VFO or VCO tends to drift.

When the VFO frequency is varied, the programmable divider is presented with a frequency other than 6.7 MHz. Hence its output will not be exactly 100 KHz.

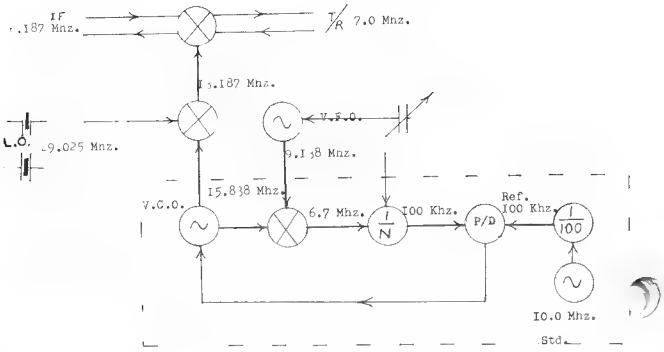
This produces an error voltage from the P/D which shifts the VCO such that a difference in frequency between the VCO and the VFO is exactly 6.7MHz. Naturally all this takes place with the speed and agility of a startled gazelle! i.e. instantaneously. For other bands, different local oscillator frequencies are employed, and a different frequency is presented to the divider. However the principle is exactly the same as described above.

..... Peter Williams, VK3IZ

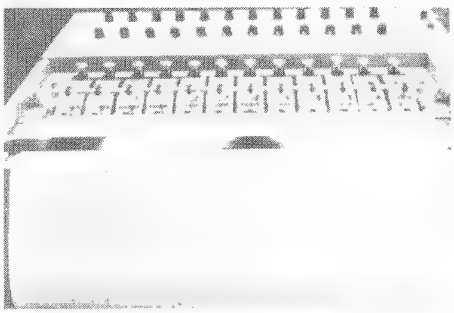
The 2020 does not have 160 metre coverage but there is some scope to bring a little "do-it-yourself" back into the shack — why not make a transverter — connections for transverter operation are on the rear panel.

Bands (meters)	Frequency (MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
WWV	15.0

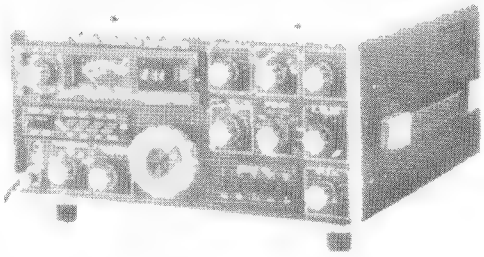
Tubes ····· 6146B ·····	2
12BY/A ·····	1
Transistors ·····	52
FETs ·····	16
ICs ·····	18
Diodes ·····	154



Peter Williams checking out the Uniden Producton Line. 45,000 quality transceivers are produced here every month of the year.



Every rig is environmentally checked and VFO stability recorded on this graph recorder which handes 12 sets at a time.



This is what we're raving about. The superb "2020" ac/dc transceiver utilising the latest in electronic sophistication.

BUT DON'T GET CAUGHT! THOSE WHO BUY FROM VICOM ENJOY

VICOM

* 90-day warranty
* Spare parts, change-over boards, engineering back-up — supported directly from the factory.
* Thorough pre-sales checkout. No "take it or leave it" attitude.
* English Manual includes mic, plugs, cables.

VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM

C66 — 100 pF mica or styroseal, grid coupling capacitor for regenerative detector. Exact function of this capacitor will be explained in a later article.

C67 — 0.27 uF 200 volt polyester, intended to earth the screen for both audio and RF signals.

C68 — 0.001 uF 200 volt polyester, audio coupling capacitor, small value used to attenuate the lower audio frequencies.

C69 — 390 pF mica or ceramic, used to attenuate the higher audio frequencies above about 3 kHz.

C70 — 0.22 uF 25 to 100 volt greencap or similar, cathode bypass for V6a, small size means that it is not effective below about 300 Hz so that low frequencies are attenuated.

C71 — 4 to 24 uF 300 volts working electrolytic, HT smoothing and decoupling capacitor.

C72 — 0.001 uF 400 volt polyester, audio coupling capacitor, small value used to attenuate frequencies below about 300 Hz.

C73 — 390 pF mica or ceramic, used to attenuate the higher audio frequencies above about 3 kHz, works in conjunction with R70 to form an elementary low pass filter.

C74 — 2.2 uF 10 volt working electrolytic, cathode bypass for frequencies above 300 Hz, has little effect below that frequency.

C75 — 4 to 24 uF 300 volt working electrolytic, HT smoothing and interstage decoupling capacitor.

C76 — 0.0068 uF 630 volt polyester, attenuates the higher audio frequencies above about 3 kHz. 300 Hz to 3 kHz is an adequate bandpass for communications quality audio.

V4 — 12AH8, frequency converter. Other valves that can be used with some modification are 6AN7, 6AE8, 6BL8, 6BE6.

V5 — 6BX6, 455 kHz regenerative detector. Other suitable valves are 6CB6, 6AU6, 6AM6 with suitable modification of circuitry.

V6 — 6BL8, audio amplifier. Other valves designed specifically for audio may be preferable, such as 6GW8, 6BM8, 6AB8, etc.

V7 — OA2, 150 volt voltage regulator. Another suitable regulator is a VR150.

L10 — 20 turns 22 B&S enamelled copper wire wound on a ¾" diameter former, close wound.

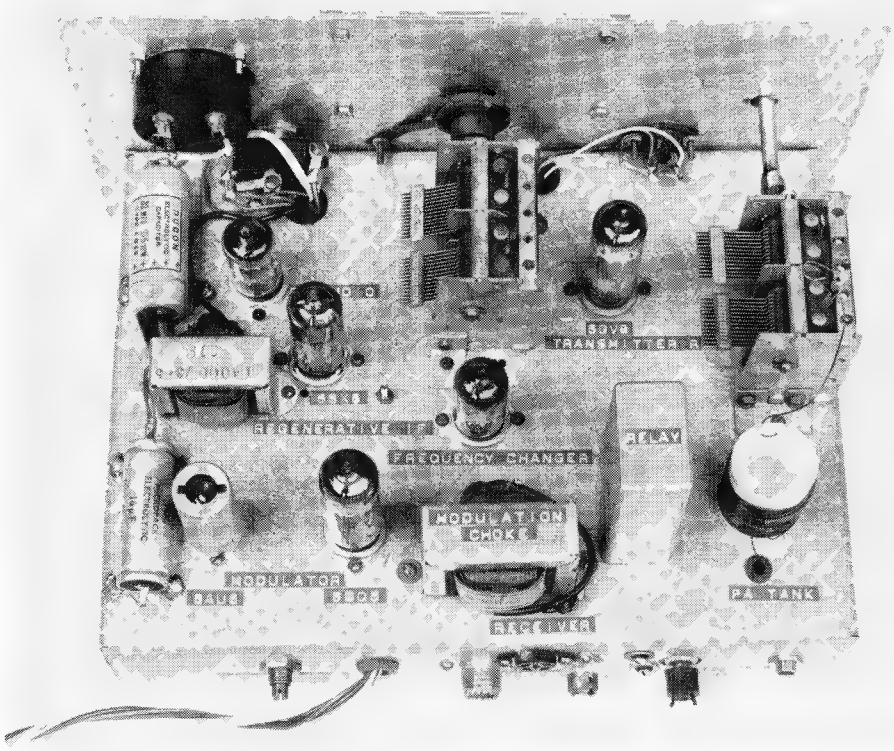
L11 — 5 turns 28 B&S enamelled copper wire wound on same former as L10. Wound over the earthy end of L10 and wound in the same sense.

L12 — 19 turns 22 B&S enamelled copper wire wound on a ¾" diameter former, close wound.

L13 — 8 turns 28 B&S enamelled copper wire wound on same former as L12 and wound at the earthy end of the tuned winding, but the winding spaced to start ⅛" away, wound in the same sense as L12, close wound.

L14 — Primary winding of the 455 kHz IF transformer.

L15 — Secondary winding of the 455 kHz IF transformer.



The novice transceiver with the case removed, clearly showing component placement on the chassis.

Note — L14, L15, C63 and C64 are all mounted in the same IF transformer can, as obtained from an old battery valve portable radio. The IF transformer is modified as will be explained in a later article.

L16 — 1 mH to 2.5 mH radio frequency choke, used as a DC return for the cathode of V5, placing the cathode effectively at the capacitive tap on L15, C64/65.

T10 — 14 K ohm to 3.5 ohm speaker transformer, used to convert the high impedance signal in the plate circuit of V6b to an impedance to suit the loudspeaker. The impedance ratio of the speaker transformer will depend on the type of output valve used and the speaker in use, e.g. 3.5 or 15 ohms.

J10 — Stereo jack with one set of changeover contacts, used to switch out the internal speaker, when an external speaker is plugged in, also used to feed a lower audio level to a suitably wired set of headphones via the second set of contacts.

GENERAL COMPONENTS

1-36:1 reduction slow motion drive with scale, such as Jabel.

3-9 pin miniature valve sockets.

1-7 pin miniature valve socket.

Control knobs to suit, terminal strips, wire, solder, nuts and bolts, small loudspeaker approximately 3" diameter, shielded cable, small mounting brackets. ■

45W TWO METRE BOOSTER AMPLIFIER

As featured in April Electronics Today, p 86 35 45 W output from 10 W drive, 12.5 V supply Just the thing to boost 10 W mobile FM rigs! Features rugged 2N6084 transistor diode switching and simple construction

ETI710 kit	$26 50
Heatsink to suit	$2.50
or p.c. board alone	$2.50

*Add P & P Kit 60c; Heatsink 60c p c b. 30

RF POWER TRANSISTORS

High quality, fully VSWR protected CTC transistors for class A B or C use to 175 MHz Bargain prices

	1 to 9	10 up
B3-12 5 W out	$5 70	$4 80
B12-12 15 W out	$7.70	$7 10
B40-12 40 W out	$17.50	$17.20

or $30 the set of three

Add P & P. 1-3 items, 30c; 3-9, 40c, 10 up 60c

VHF CONVERTER KITS etc.

Modern solid state converters featuring FET front ends, bandpass design, simple construction, choice of IF frequencies. Crystals not included. Featured in February ELECTRONICS TODAY, p 63

28 MHz (ETI707B)	$11 00
52 MHz (ETI707B)	$11.00
144 MHz (ETI707A)	$14 00

Also:

432 MHz FET Conv.	$14 00
Marker Generator	$10 00

*Add P & P: 60c per kit

Send S.A.E. for details on other devices.

Neosid coil and ferrite components, Ermenco trimmers etc

AMATEUR COMMUNICATIONS ADVANCEMENTS

P.O. BOX 57, ROZELLE, 2039.

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

This month we have a few new modifications to the Yaesu FT101 transceiver, but firstly a few thoughts on the design of the modern HF SSB transceiver. Perhaps readers might like to add to the list month by month.

WHY DON'T THEY?

Why is it that manufacturers of transceivers do not incorporate a couple (at least) of AC power outlets on the back panel. Every Hi-Fi amplifier worth its salt has this facility. If your shack is anything like mine you are probably using half a dozen power points plus a few double adaptors to get power to everything.

NEXT THOUGHT

It is about time that HF transceivers incorporated an SWR meter. After all they are mostly designed for portable as well as home operation, but every time you pop it in the car, it is usually necessary to connect up an external SWR meter which will never sit in place.

FINALLY, FOR THIS MONTH

Why not incorporate separate bias controls for AC and DC operation. It is an unusual transceiver that does not require adjustment in this respect.

What opinions do you have on these and other points.

THE FT101

One of the advantages in buying a G3LLL RF speech clipper is that every so often the distributors of these excellent little units send out modification sheets for the 101 to people on their mailing list.

The latest one received contains the zener diode AGC modification published in this column some months ago and two other interesting hints that I will now pass on.

IMPROVED AM RECEPTION

This simple modification will be found to give greater clarity and increased sound output in the AM mode.

1. Locate the 10K resistor going from one end of the AM detector diode to chassis and remove same.
2. Replace 10K resistor with any small signal germanium diode.
3. There is a 50/50 chance as to whether or not you have wired the diode in the correct polarity, so now try the set out. AM should be louder and clearer. If it is very weak and distorted reverse the diode.

FT101 MARK I IMPROVED RECEIVE AUDIO

Some early Mark 1's, especially those fitted with output transistors instead of an audio IC, have a tendency to excessive low frequency content in the receive audio giving muddled sound with a marked tendency to speaker rattle. The following modification rolls off the low audio frequencies and gives clearer sound.

1. Locate the RF choke going to the 'hot' end of the AF gain control and disconnect from same.
2. Re-make the connection from the choke to the AF gain control via a series capacitor of about .05 uF.
3. Instal 10 K ohm resistor, one side being connected to the junction of the capacitor and the RF choke, the other side going to the chassis.

Next month, amongst other things, some simple and effective modifications for the Kenwood TS 520. ■

IARU NEWS

Last month we concluded our examination of ITU Table of Frequency Allocations and as promised in February 1976 AR we will now return to the "escape clauses"

If a service may operate in a specific frequency band subject to not causing harmful interference, this means also that this service cannot claim protection from harmful interference caused by other services to which the band is allocated (No. 148) A somewhat complex example of this would be the use of amateur satellites in the band 435-438 MHz

Clause 413 recognises that the frequency bands from 5 to 30 MHz are particularly useful for long-distance communications and the member countries agree to make every possible effort to reserve these bands for such communications The minimum power necessary shall be employed. Clause 423 (2) states that in principle broadcasting stations using frequencies below 5060 kHz (except the band 3.9 to 4.0 MHz) or above 41 MHz shall not employ power exceeding that necessary to maintain economically an effective national service of good quality within the frontiers of the country concerned

Article 4 of the Regulations caters for special agreements between countries.

Clause 115 says that administrations of member or associate member countries of the ITU shall not assign to a station any frequency in derogation of the Table or other Regulations except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the Convention and Regulations Incidentally countries ratifying the Radio Regulations can, and do, make reservations of many kinds. Certain countries (not many) appear not to be members of the ITU

Clause 704 says that member countries should exercise the utmost goodwill and mutual assistance to the settlement of problems of harmful interference. Clause 705 goes into the considerations which must be given Subsequent clauses set out procedures for mutual co-operation and recourse to the International Frequency Registration Board (IFRB) set up under the Regulations

Article 9 of the Radio Regulations (Clauses 486 to 639) requires that frequency assignments to fixed, land, broadcasting, radionavigation land, radiolocation land, standard frequency stations and ground-based stations in the meteorological aids service shall be notified by administrations in the prescribed detail to the IFRB. The IFRB maintains a Master International Frequency Register. Similar provisions apply to administrations intending to establish a satellite system (art. 9A).

Article 13 deals with monitoring and Appendix 8 sets out the form of report of harmful interference Various CCIR Recommendations refer to international monitoring.

Clause 693 says that all stations are forbidden to carry out unnecessary transmissions, the transmission of superfluous signals and correspondence the transmission of signals without identification In the last case there are special exceptions for distress and other special radio systems. 694 says that all stations shall radiate only as much power as is necessary to ensure a satisfactory service.

Clause 698 states that Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, incl. power networks, does not cause harmful interference to a radio service operating in accordance with the Regulations. 701 states that emissions made by a station for tests, adjustments or experiments shall transmit frequent idents at slow speed

Clause 722 states that administrations bind themselves to take the necessary measures to prohibit and prevent 723 (a) the unauthorised interception of radiocommunications not intended for the general use of the public 724 (b) the existence or divulgence of anything intercepted under 723. Clause 719 states that infringements of the Radio Regulations shall be reported to their respective administrations by the stations detecting them on an Appendix 7 form.

Clause 725 states that no transmitting station may be established or operated by a private person or by any enterprise without a licence issued by the government of the country and Clause 728 says that the holder of a licence is required to preserve the secrecy of telecommunication as provided for in the Convention

Article 41 (1560 to 1567A) deals specifically with amateur stations. 1560 forbids communications if one country has notified objection to amateur radio 1561 says that transmissions between amateur stations shall be made in plain language and shall be limited to messages of a technical nature to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. Third party traffic is absolutely forbidden unless (1562) modified by special arrangements between the administrations of the countries concerned.

Clause 1563 (3) says that an amateur station operator shall have proved he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals but administrations can waive this for stations making use exclusively of frequencies above 144 MHz. And 1564 states that administrations shall take measures to verify the technical qualifications of amateur station operators. 1565 says that the maximum power of amateur stations shall be fixed by administrations having regard to the technical qualifications of the operators and to the conditions under which these stations are to work

1566 says the Convention and Regulations apply to amateur stations and that the emitted frequency shall be as stable and as free from spurious emissions as the state of technical development for such stations permits. 1567 says that during the course of their transmissions amateur stations shall transmit their call sign at short intervals and 1567A deals with the amateur satellite service in shared bands.

Article 42 deals with experimental stations.

The Radio Regulations of the ITU were of course ratified for Australia by the Government subject to specified variations, etc. Since the volume of the Regulations is nearly 2 inches thick and the whole thing so complex and so full of detail the excerpts given here are brief, condensed and not suitable for quotation in any matter of importance

WARC 1979

As foreshadowed last month the importance of the IARU meeting in Miami, immediately after the conclusion of the Region 2 Conference, has assumed such importance that the Federal President has sought and obtained Federal Council approval to attend in person. Your Federal President is also Chairman of Committee No. 2 to formulate the proposals of the amateur and amateur satellite services for the Government's Preparatory Group for the Australian brief for WARC 1979. The first meeting of the Committee is to be held on the 5th of April prior to his trip to Miami. A lot of work is going on to prepare the WIA case

INTRUDER WATCH

Alf Chandler VK3LC, in addition to being the WIA Federal Intruder Watch Co-ordinator has kindly consented to and has been accepted as the IARU Region 3 Association Intruder Watch Co-ordinator. ■

CONTESTS

Ken Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

May

8-9	Bermuda CW
9.5-29 11	Yugoslavia YZ-30 Contest
14-16	YL ISSBers QSO Party
22-23	USSR CQ-M Contest

June

5-13	Townsville Pacific Festival Contest
12-13	RSGB National Field Day
12-14	Midwinter Field Day (VHF)
26-27	ARRL Field Day

July

24-25	ARRL Bicentennial

YUGOSLAVIA YZ-30 CONTEST

From 9/5/76 to 29/11/76

In celebration of the 30th Anniversary of Liberty the SRJ has organised the YZ-30 Contest All Yugoslavian stations will use the special YZ prefix

All bands and modes will be used but no cross band or cross mode. The exchange will be a signal ort only

Only requirements for the colourful YZ-30 certificate is contacting 30 or more YZ stations

Your log should contain time and date, YZ station worked, signal report and frequency It is requested that you also include the usual signed declaration and 3 IRCs to cover mailing

Send to SRJ YZ-30 Contest, PO Box 48, 11001 Belgrad, Yugoslavia.

YL ISSBers QSO PARTY

1901 GMT 14/5/76 to 1900 GMT 16/5/76 with two rest periods.

Rules are lengthy and are available from W7EOI

Frequencies. CW 3565 7085 14070 21070. Phone 3873 7273 14333 21373 28673 DX on 3775 7090

Logs to L W Coleman, W7EOI, 412-19th Street SW Great Falls, Montana 59404

TOWNSVILLE PACIFIC FESTIVAL CONTEST

The aim of the contest is to promote an interest in the Townsville Pacific Festival, and to increase activity on all Amateur Bands by stations in Australia, New Zealand, Pacific Islands and all countries bounding the Pacific Ocean.

I trust that all will participate and enjoy the contest and make it as interesting as past contests.

1. Time of contest The contest to be run for 8 days 0001 GMT Saturday 5th June 1976 — 2359 GMT Sunday 13th June 1976

2 Sections:
- (a) Transmitting all bands phone only
- (b) Transmitting all bands CW only
- (c) Transmitting all bands Open
- (d) Transmitting VHF and UHF VK only
- (e) Receiving all bands Open

3. Logs: These are to show the section entered and points claimed for each contact. This is most mportant, as if points claimed is not completed only 1 point per contact will be allowed. VHF logs must show distance in kilometres between stations.

4. Contacts
- (a) CW to CW contacts count as double score
- (b) One (1) contact per band per mode a day only
- (c) No cross band contacts
- (d) Repeater contacts do not score

5 Awards: Perpetual Trophy is held by TARC and it will be inscribed with the name of the winner, who will receive a smaller trophy

Overseas Stations (excluding VK, P29, ZL) with the highest score will receive a "Pacific Festival medallion. Section winners will be awarded a certificate

6. Scoring. HF stations.

BONUS POINTS — EXCEPT VK4 STATIONS

15 points for contacts with VK4WIT
9 points for contacts with other Townsville stations.

VK4 STATIONS

1 point per contact for working VKWIT or other Townsville stations (Intrastate contacts not otherwise permitted for scoring)

OVERSEAS STATIONS — EXCLUDING ZL, P29

3 points for contact with any VK station
5 points for contact with any VK Club station
9 points for contact with any Townsville station
15 points for contact with VK4WIT

ALL STATIONS

160 metres — 5 bonus points per contact
RTTY and TV — 10 bonus points per contact
CW/CW — double points

SCORING TABLE VHF/UHF STATIONS

0-50 km	1 point
50-100 km	— 2 points
100 200 km	· 3 points
200-400 km	— 4 points
400 and over	— 5 points

Bonus points — VHF/UHF stations only other than Townsville stations — Contacts with your local club station add 15 points only if your club station has contacted VK4WIT in preceding 24 hours (contact number must be recorded) Townsville stations receive one point per contact only

7 Identification

All station Identity for the ease of scoring for example

(Phone) VK4WIT Townsville
(CW) VK4WIT/TVL

Send logs to
Townsville Pacific Festival Contest
VK4WIT — CHC No 6568
PO Box 964,
TOWNSVILLE, 4810,
Australia

Entries close 30 September 1976

MID-WINTER FIELD DAY CONTEST (VHF)

Starts at 1200 EAST, Saturday 12th June finishes 1400 EAST Sunday 14th June

RULES

1 All bands 52 MHz and above may be used

2. One contact per station per band per clock hour. You may work a station one minute before and after the hour

3 Serial numbers shall be exchanged in the form of a signal report followed by consecutively increasing numbers

4 Minimum contact distance is 1 km

5. Crossband, HF and repeaters may be used for contact set up but not for scoring

6 All FM frequencies classed as nets: Oscar 6 and 7 are not classed as repeaters

SECTIONS

1 Field stations; 2 Mobile stations, 3 Home stations Best 6 consecutive clock hours and best overall score in each section

ENTRIES

Logs can be handed to a VHF committee member or posted to the VHF and TV Group, 14 Atchison Street, Crows Nest, 2065 Entries close 13/8/76 Logs must have date, time call signs, locations of both stations, serial numbers, points claimed band and modes used

1976 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY CONTEST RESULTS

24 HOUR DIVISION

Section (a) Tx Phone

VK 4XZ	1601	7TT	46[illegible]
3ALZ	578	7AX	429

Section (b) Tx CW

VK 7HE	1414	3TX	8[illegible]
5DL	1262		

Section (c) Tx Open

VK 2CAX	2243	1DA	[illegible]
3JI	1484		

Section (d) Tx Phone Multi Op

VK 3ATL	5230	4WIT	2360
1WI	3016	3ANR	2265
3BCG	2610	3BGG	1474

Section (e) Tx Open Multi Op

VK 3ATM	5487	2WG	3189
1ACA	4575	5LW	2349
3AUQ	4131	3XK	1613
8DA	3715		

Section (f) VHF Portable/Mobile

VK 2AHE	1470	4ZGB	160
2ZCT	853	1ZVT	149
4ZIG	578	4ZGR/7	102
3AYF	396	3AF[illegible]	100
4PV	308	3YFC	40
3YIA	190		

Section (g) Home Tx Stations

VK 3CM	870	5NJ	3[illegible]0
1LF	455		

Section (h) Receiving

E W Trebilcock	460 [illegible]
C H Thorpe	445

6 HOUR DIVISION

Section (a) Tx Phone

VK ANM	449	[illegible]VC	2[illegible]4
3ADW	400		

Section (b) Tx CW

VK 2YB	386	3X[illegible]	220
2JM	226		

Section (c) Tx Open

VK 7AL	635	4AAP	388

Section (d) Tx Phone Multi Op

VK 4WIM	1548	3R[illegible]	836
5KR	1044	4AYM	801

Section (e) Tx Open Multi Op

VK 3BDQ	803

Section (f) VHF Portable/Mobile

VK 3ZJS	725	3ZBY	336
2ZHT	640	2BSU	249
2AHE	542	1[illegible]F	160
3BCH	466	3YAY check log	
5ZCF	449		

Section (g) Home Tx Stations — Nil

Section (h) Receiving — Nil

NOTE—Checking of logs not complete, so scores and placings are subject to confirmation ■

SCORING TABLE — VK, ZL, P29 STATIONS

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9/P29	ZL	VK0
VK0	7	7	7	7	7	7	7	7	7	7	—
VK1	—	1	1	2	3	4	2	4	5	3	7
VK2	1	—	2	1	2	4	3	4	5	3	7
VK3	1	2	—	3	2	4	1	6	4	3	7
VK4	2	1	3	—	4	6	5	2	1	4	7
VK5	3	2	2	4		1	3	4	5	4	7
VK6	4	4	4	6	1	—	4	1	5	6	7
VK7	2	3	1	5	3	4	—	6	5	3	7
VK8	4	4	6	2	4	1	6	—	2	4	7
VK9/P29	5	5	4	1	5	5	5	2	—	6	7
ZL	3	3	3	4	4	6	3	5	6	—	7

VK, ZL, P29 to other Pacific seaboard countries and islands 1 point

SCORING TABLE

km	6m FM	Tune	2m FM	Tune	70 cm	ATV	576 up
1-50	1	2	1	3	4	20	10
51-100	2	4	2	6	10	50	50
101-150	5	10	5	15	30	150	100
151-300	10	20	10	30	50	250	200
301-500	25	50	15	45	100	500	500
501-800	20	40	25	75	200	1000	600
801-1200	15	30	35	105	400	2000	700
1201-2000	10	20	75	225	500	2500	800
2001 up	25	50	125	375	600	3000	1000

Oscar 2-10 Translator 20 VK/ZL 50 other countries
70-2 Translator 50 VK/ZL 100 other countries
ATV Serial numbers must be exchanged on vision and sound. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

21 Bovelles St., Camp Hill, Qld., 4152

The Editor,
Amateur Radio,

Dear Sir,

I read with interest VK2SK's article on the G4ZU "X" Beam, and hereby offer some suggestions, and information, from my own extensive experiments with this array dating back to approximately 1969 when VK3PP, VK3CR and others were also using it with much success. Like Charlie 3PP, I have lost count of the number of data sheets posted to Vk, ZL and DX countries giving the necessary constructional details

It took me two years to get Jim ZL2NH to build one! After correspondence with "Dicky" Bird G4ZU, I proceeded to try and improve the performance of this compact beam, and found a slight improvement resulted when the Radials were increased from 12 ft., the original length, to 13 feet This has the effect of wide-spacing the two elements, and tuning was not so critical.

In my case I used "ex-army" copper-plated "whips" for the radials, and very light wire Although it drooped, it was self-supporting. With 13 foot radials, the wire "tails" were 6½ ft. and 7½ ft respectively, and a **permanent** one-turn loop of 16 g wire was placed in the centre of the **director** for grid-dipping purposes

This is the most important part of the tuning operation and should be done with the beam as high as possible Increasing the height from 6 ft to 35 ft. altered the resonant frequency by approx 50 kHz! Do NOT rely on the GDO dial, but have a second-operator listen to the GDO on a calibrated receiver to ascertain the "dip" frequency If the Director is not tuned the beam will be next to useless

Tuning the antenna is simply a matter of altering the length of the wire "tails" (both ends) by one inch at a time. Performance was much improved, both receiving and transmitting, by using a balun

As the G4ZU "X" beam is basically a compromise of a normal 2-el. Yagi, naturally performance cannot be as good as a straight 2-element beam This is mainly due to the shortened elements (radials), the wire tails contribute almost nothing to performance, and are only for resonating purposes. However, its main advantages are: compactness, and ease and cheapness of construction

In conclusion, I worked approximately 250 countries on this antenna, in two years, but conditions were good in those days!

FRED LUBACH VK4RF

(Copies of Fred's data sheet may be obtained from him at the above address — please forward s.a.s.e. — Ed.). ■

The Editor,
Dear Sir,

Novice and would-be Novice Amateurs are facing two immediate problems, namely a source of relatively cheap crystals for 80 and 15 metres, and a directory of slow morse stations that they may obtain practice from prior to the examinations

I am of the understanding that the Ladies' Amateur Radio Association is establishing a bank of crystals which will be available for use by Novice Amateur Radio Operators. I am not sure whether they intend to hire the crystals or sell them at an attractive price to Novices. Perhaps LARA can let AR know of the methods to obtain suitable crystals from them, or advise me so that I can inform Novices via AR. Crystals are rather expensive in Australia. The minimum price that I have heard of for an 80 metre crystal is $5, and the more common price is $7 plus tax. Overseas crystals for 80 metres sell for $3 American plus airmail post. Perhaps one or more of the local crystal manufacturers would care to produce crystals in bulk for the Novice operators Anyone with ideas?

I have received a number of requests for lists of stations sending slow morse for prospective amateurs. Can the operators of these services please let me know when and on what frequencies these sessions take place and the speeds used I received no replies to a similar request a couple of years back For the sake of the prospective new licensees I hope that the pople concerned will advise me of the facts so that they may be published in AR

Rodney Champness VK3UG

The Editor
Dear Sir

March issue of AR (p.25) carries a small item regarding ARRL DXCC listings, and gives the false impression that only two Australian Amateurs have more than 300 countries confirmed. (AR for January lists at least 17 VKs with over 300!)

As we all know Australia has its own DXCC Awards system, using the ARRL official list of countries, ably managed by Brian VK5CA, and it is therefore unnecessary to mail cards to USA, which is an expensive exercise these days

I am surprised that this type of article has appeared twice in recent months without anyone bothering to explain the reason for the lack of VKs on the ARRL list!

Fred Lubach VK4RF.

(See the Awards Column in this issue for the latest VK DXCC top listings—Ed.)

The Editor
Dear Sir,

18th JAMBOREE OF THE AIR —
PAPUA NEW GUINEA

1. Papua New Guinea became a sovereign state on the 16th September 1975 Previous to this, the country was self governing but legally tied to Australia as the Territory of Papua and the Trust Territory of New Guinea. On October 18th and 19th, Papua New Guinea voiced its independence for the world to hear, for on those two days, the PNG Scouting Association and the fraternity of Amateur Radio Operators throughout the country united to produce the first PNG Jamboree of the Air (JOTA). This article describes the event, its organisation and, I believe, success

2. For some time amateur radio operators have assisted the Australian Scouting Association (PNG Division) each year to produce the Jamboree of the Air Credit here goes to stalwart pillars of amateur radio in PNG such as P29VF, P29BS and many others 1975 showed the voice of PNG as a new nation and the 1975 JOTA proved a great success.

3 The 1975 PNG JOTA was organised by Mr. Joe Kivori, Field Commissioner of the PNG Scouting Association National Headquarters. The event was advertised in the national newspaper — Post Courier — and also over the national radio station, NBC. Mr. John Baker, a member of the Royal Australian Air Force on loan to the Papua New Guinea Defence Force and holder of call P29WB rallied the PNG amateurs throughout the country Mr Kivori organised the Scouts, Guides, Clubs and Brownies into four major groups, to cover the four operating periods throughout the weekend. P29WB co-ordinated the amateurs and the equipment to provide the service.

From left to right front row: P29AX Harry Sims, Police Commissioner Mr. Pious Kerepia, OBE (with microphone), P29WB John Baker. Supporting Cast: Leaders and Scouts from PNG.

4 The major centre of activity was Port Moresby, the National Capital Activities commenced early on the morning of Saturday 18 Oct. 75, with the erection of portable aerials and equipment on Tuaguba Hill, in Port Moresby. Permission was granted to use the residence reserved for visiting dignitaries to PNG, and all fraternities associated with scouting, and their leaders gathered at 10 am for the opening. The opening address was given by Mr. Pious Kerepia, OBE, Police Commissioner and acting Chief Scouting Commissioner for PNG. At the conclusion of his address, the Commissioner led his scouts and guides in singing the PNG national independence anthem. Contacts were made with Queensland, New South Wales, Victoria and South Australia, and messages between scouts and guides were exchanged with VK5 Baden Powell the official South Australian Scouting Association station transmitting from the Scout Camp at Woodside in the Adelaide Hills and Mrs. Williams the Queensland State Commissioner for Guides, to name a couple.

5 PNG Scouts and Guides told their counterparts in the Pacific and Asia of their country, their way of life, Independence celebrations and their scouting activities. Kovi Saum of the 1st Morosi Troop spoke Pidgin English to David Black of Charters Towers. Elizabeth Wallis of the 1st Elevala Rangers exchanged greetings and ideas with Mrs Williams in Queensland. Many others participated.

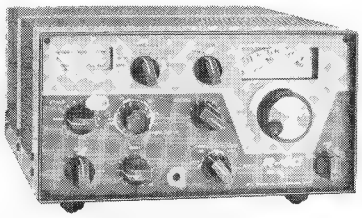
6. The opening session closed at 1 pm local time to relocate at the Boroko Scout Hall. More antenna erecting and equipment placement had the PNG JOTA active by 2 pm. Amateur operators in the Port Moresby area who participated were: P29AX Harry Sims, a new arrival from New Zealand; P29 Phil Nancies, a respected PNG businessman and keen amateur radio enthusiast; P29GR Garry Ryan who was disappointed that 6 metres was not open to Australia for the weekend; P29WG Bill Gielis who was residing in the area for a short while and who offered his equipment and assistance. P29JS Jim Smith a professional communications engineer, recently arrived from England and P29JM Jack McDonald another arrival who ably assisted in aerial direction and the ensuing clean up. P29WB John Baker, acted as the co-ordinator. The equipment used ranged from Yaesu Musen FT-101B to Galaxy transceivers and the antennas were a G5RV and a hy-gain 14AVQ.

7. The other major centre of activity was at Vanimo. Vanimo is a small township nestled in a coastal bay in the north west corner of the PNG mainland only 10 miles from the PNG/Irian Jaya border. P29CD Barry Dundas provided the equipment; a FT-101B and a TH3MK3 tri-bander yagi. Forty scouts crammed into Barry's small shack to speak to scouts in New Zealand, the Cook Islands Australia, Italy, the Marshall Islands (Pacific Ocean), Israel and Greece. One contact was made with an 80-year-old gentleman in England who chatted merrily to all of the scouts for quite a while.

8. The weekend activities closed at 5 pm local time on Sunday 19th October 1975 Some 100 scouts were able to converse with their counterparts all over the world. The activity was thoroughly enjoyed by all who attended.

J Baker P29WB

DRAKE AMATEUR C LINE



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Dependability . .

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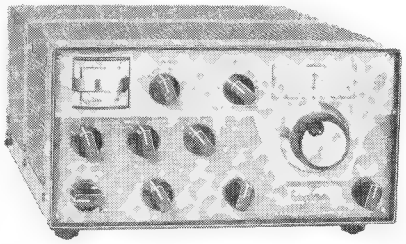
$695

• **Linear permeability tuned VFO** with 1 kHz dial divisions. VFO and crystal frequencies pre-mixed for all-band stability • **Covers ham bands** 80, 40, 20, 15 meters completely and 28.5 to 29.0 MHz of 10 meters with crystals furnished • **Any fifteen 500 kHz ranges between 1.5 and 30 MHz** can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 MHz not recommended) • **Electronic Passband tuning** gives sideband selection, without retuning • **Accessory Noise blanker** operates on CW, SSB, and AM • **Notch filter and 25 kHz crystal calibrator** are built-in • **Product detector** for SSB/CW, **diode detector** for AM • **Crystal Lattice Filter** gives superior shape factor and ultimate selectivity for better adjacent channel rejection • **Solid State Permeability Tuned VFO** • **Three AGC Release Times,** two for SSB and AM plus fast release for break-in CW. Also AGC off. • **Excellent Overload and Cross Modulation characteristics** • **Dimensions:** 5½"H, 10¾"W, 12¼"D (14.0 x 27.3 x 31.1 cm). **Wt.:** 16 lbs. (7.3 kg).



TR-4C
SIDEBAND TRANSCEIVER
$630

GENERAL: • **All amateur bands** 10 thru 80 meters in seven 600 kHz ranges • **Solid State VFO** with 1 kHz dial divisions • **Modes** SSB Upper and Lower, CW and AM • **Built-in Sidetone** and automatic T/R switching on CW • **30 tubes and semi-conductors** • **Dimensions:** 5½"H, 10¾"W, 14⅜" D (14.0 x 27.3 x 36.5 cm), **Wt.:** 16 lbs. (7.3 kg).

TRANSMIT: • **VOX or PTT** on SSB or AM • **Input Power:** SSB, 300 watts P.E.P.; AM, 260 watts P.E.P. controlled carrier compatible with SSB linears; CW, 260 watts • **Adjustable pi-network.**

RECEIVE: • **Sensitivity** better than ½ μV for 10 dB S/N • **I.F. Selectivity** 2.1 kHz @ 6 dB, 3.6 kHz @ 60 dB. • **AGC** full on receive modes, variable with RF gain control, fast attack and slow release with noise pulse suppression • **Diode Detector** for AM reception.

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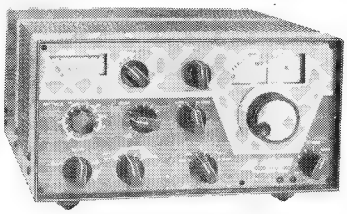
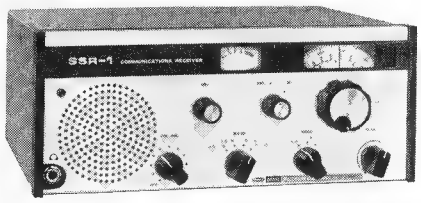
Superior performance—versatility!



Use VFO of either R-4C or T-4XC for transceiving or separately.

T-4XC
TRANSMITTER
$625

• **Covers ham bands** 80, 40, 20, 15 meters completely and 28.5 to 29.0 MHz of 10 meters with crystals furnished; MARS and other frequencies with accessory crystals, except 2.3-3, 5-6, 10.5-12 MHz. • **Upper and Lower Sideband** on all frequencies • **Automatic Transmit Receive Switching on CW** (semi break-in) • **Controlled Carrier Modulation for AM** is completely compatible with SSB linear amplifiers • **VOX or PTT** on SSB and AM built-in • **Separate VOX Delay Controls** for SSB/AM and CW. • **Adjustable PI-Network Output** • **Two 8-pole Crystal-Lattice Filters** for sideband selection, 2.4 kHz bandwidth • **Transmitting AGC** prevents flat topping • **Shaped Grid Block Keying** with side tone output • **200 Watts PEP Input on SSB** — 200 watts input CW • **Meter indicates plate current and relative output** • **Compact size; rugged construction** • **Solid State Permeability Tuned VFO** with 1 kHz dial divisions • **Solid State HF Crystal Oscillator** • **Dimensions:** 5½"H, 10¾"W, 12¼" D (14.0 x 27.3 x 31.1 cm). **Wt.:** 14 lbs. (6.4 kg).



SSR-1
COMMUNICATIONS RECEIVER
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- **Synthesized • General Coverage**
- **Low Cost • All Solid State • Built-in AC Power Supply • Selectable Sidebands**
- **Excellent Performance**

PRELIMINARY SPECIFICATIONS: • **Coverage:** 500 kHz to 30 MHz • **Frequency** can be read accurately to better than 5 kHz • **Sensitivity** typically 0.5 microvolts for 10 dB S+N/N SSB and better than 2 microvolts for 10 dB S+N/N AM • **Selectable sidebands** • **Built-in power supply:** 117/234 VAC ± 20% • **If the AC power source fails** the unit switches automatically to an internal battery pack which uses eight D-cells (not supplied) • **For reduced current drain** on DC operation the dials do not light up unless a red pushbutton on the front panel is depressed.

The performance, versatility, size and low cost of the SSR-1 make it ideal for use as a stand-by amateur or novice-amateur receiver, short wave receiver, CB monitor receiver, or general purpose laboratory receiver.

ELMEASCO INSTRUMENTS PTY. LTD.

P.O. BOX 334, BROOKVALE, N.S.W. 2100 — 939-7944.

MELBOURNE — 26-6658
ADELAIDE — 42-6666
BRISBANE — 36-5061
WELLINGTON, N.Z. — 69-7566

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5233

AMATEUR BAND BEACONS

VK0	VKOMA, Mawson	53.100
	VKOGR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K2IRT/KG6, Guam	50.098
VE	VE1ATN, Canada	50.056
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

Some people in the southern States in particular might wonder why so many overseas beacons are listed. There might not be much chance for us to hear the Pacific and northern beacons, but I would think quite a few operators in northern VK2 and in VK4 would be looking around when conditions are suitable. Similarly with the 144 MHz beacons in New Zealand. Perhaps little chance for most of the year in VK5, but I guess there are possibilities existing for those in VK2 and VK7 from time to time. It's like I always say, if you are in the shack doing something other than operating on the air, why not monitor some frequency according to weather conditions and time of year. You might be surprised what you hear. Have those in VK5 noted how much of Channel 0 TV from Brisbane and Wagga is to be heard at ANY time of the year. Monitor them and see.

Pleased to note that the South East Radio Group in Mount Gambier are going to stage another convention this year over the weekend of 12th and 13th June. Unfortunately the VK5 holiday weekend once again does not correspond with the Victorian holiday, so arrangements are being tailored to allow as much mixing of the various populations as the shorter weekend will allow. My spies have already informed me of something very different for the Saturday night, and there looks like being a jumble sale on the Sunday which should be good news for many — perhaps if those who attend do not bring too much trash the standard of sales could be kept up and some worthwhile exchanges made. Entries are invited again for the home construction section, which has proved very popular for some time now.

While on the subject of Mt. Gambier I would like to say thankyou on behalf of the amateur population for the efforts of the amateurs in that town in manning VK5BMG during the "Back to Mt. Gambier" Centenary Celebrations. I had very little trouble in making the required five contacts, and those of you who did, do not forget to send in your application for the award; this will make the SE boys feel the work was worth the time and effort expended.

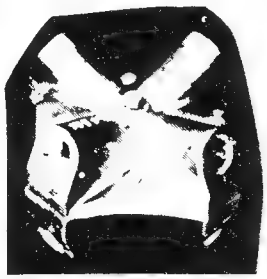
A note from John VK4OI attached to the Gold Coast Radio Club Newsletter mentions nothing was heard up there of the elusive summertime 144 MHz DX. Art VK4FE was desperately trying for a VK6 to complete WAS on 2 metres but to no avail. There is plenty of 144 MHz activity in VK4 it appears, especially around Brisbane on 144.1, and many of the boys are continuing to keep a look out for signals from the southern States, so keep the beams north more often. John also mentions hearing that the Brisbane VHF Group have a 432 MHz beacon going (nobody "ain't" told me yet . . . 5LP). With the general increase in distances being worked on the 432 MHz band, especially across the southern part of Australia, perhaps some 432 MHz beacons might help, though for that matter 2 metres will still be the main indicator of what happens on 432. Thanks, John.

At the March meeting of the Gold Coast Radio Club Pat VK4FI produced a letter from a friend in America from the State of Virginia, who said that some CBers were driving their power amplifiers to 500W and 1 kW output, some even as high as 2 kW output! They think they are smart, but the powerful rigs were causing TVI and were even interfering with the naval base at Bremerton, Washington. The authorities got tough and confiscated the gear, including 129 rigs and cars, and could have fined them up to $5000 a day while using the gear! Those whose gear was confiscated are now on the blacklist and can no longer take examinations for communications or electronics associated with the work the FCC regulates. Mt. be a moral in this story for some in VK .and!

Just to show how news gets to me at times, I recently received a note from Ron VK5SD who passed on a message from Claud VK4UX in Rockhampton, via 20 metres! Thanks, chaps.

The report mentions that Claud VK4UX had a breakthrough to Japan on 52.050 SSB on 20/3/76 at 0420Z, to JA7NAM and JG1TRW. That's the first report for this year . . . Rockhampton now have their repeater licence again, call sign VK4RAR, frequencies 146.1 up 146.7 down . . . VK4MM has been working consistently through the satellite Oscar 6 and Oscar 7 have caught up with each other and are now only 5 to 6 minutes apart giving a longer period of use.

ANTENNA PARTS, KITS



QUAD HUB $35.00 plus Postage (3 kg) mass.

QUAD KIT $135.00. Freight forward.

Consisting of Hub 12 ft solid F/G Spreaders Aluminium Extenders Ferrules Adaptors 350 ft 0.064 Hard Drawn Copper wire
Nylon line and insulators

MOBILE ANTENNA PARTS:
6 ft. solid F/G blanks, ½-¼ inch **$4.50 ea.**
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Brass tip chuck **50c**

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DIGITAL DISPLAY YC-601
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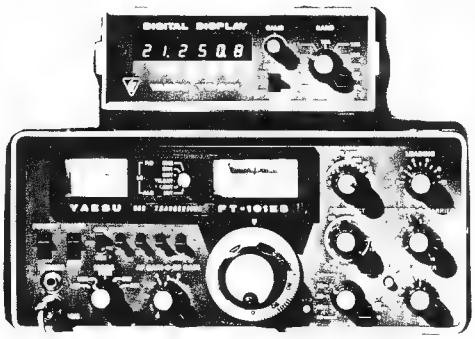
The Model YC-601 displays actual transmit and receive frequencies on six bright, green coloured digital display tubes.
All amateur bands are switch selected for complete frequency readout with 100Hz accuracy.
The power supply is built-in.
Connection cable is supplied with the unit.



Technical Data
Display: 6 digits, 100Hz Readout
Clock Oscillator: 1.31072MHz
Gate Time: 0.1 sec.
Ambient Temperature: 0°C~40°C
Power Source:
100/110/117/200/220/234V AC 50/60Hz
Power Consumption: Approx. 10VA
Size: 220(W) x 80(H) x 235(D) m/m
Weight: Approx. 2.5kg.

Digital Display Unit only
Price $189

Prices include S.T. Allow 50c per $100 insurance, min. 50c.
Prices and specifications subject to change. Freight extra.

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Phone: 89 2213 FRED BAIL VK3YS JIM BAIL VK3ABA JAS 7576-19

MOONBOUNCE REPORT

Sorry to hear Lyle VK2ALU has been afflicted with spinal injuries and hospitalisation, but now convalescing at home. This has restricted to some extent the activities of the VK2AMW EME schedules. We hope you will soon be better, Lyle.

The February tests were carried out, however, with some difficulty due to lack of experienced personnel, but Charlie VK2ZEN and a group did a good job in manning the station for the first W/VE test period. Only VE4JX was heard, but a contact could not be completed.

144 MHz seems to be the main band of interest here in VK5 at the moment. I notice from my own log book that 80 per cent of VHF contacts have been on that band, most of them over the 250 mile path to Mt. Gambier. Signals generally have been very consistent, plenty of 5x6 and 5x7 type contacts, but rising to well over S9 towards the end of March. There is now some very good equipment in VK5 for 2 metre operation, and some very fine antenna systems are either on the way or in use. The Barossa Valley group of 2 metre stations, Keith VK5SV, David VK5KK, Clarrie VK5NA, Peter VK5ZPW and myself VK5LP on the fringe of the valley are all pretty active, and not much gets past the ears in the group. We are all looking for long distance contacts with special thoughts towards south-western VK2, Canberra, together with any part of VK3 or VK7. VK5SV and VK5KK have a tremendous take-off to the east and south east, so what about a few others in the areas mentioned really giving it a try, particularly when the weather map tells you conditions should be right. I would very much like to work a 2 metre station in Canberra, or Broken Hill for that matter, and I would reckon the rest of the gang would be there too!

With the coming of the winter months there will surely be 2 metre DX to be found around 144.1 on SSB or CW. Why not a resolve by all those with suitable equipment to see what can be worked this year? There must be scores of stations with small 2 metre SSB rigs. Why not build a linear to add to it, they will drive a QQE06/40 easily. If you do not have the time or skill to make your own, commercial linears for 2 metres are advertised as being available at a fairly reasonable price, so you can up your power that way. All this, coupled to a good ten element yagi, will put most of you in the ball park. Do not expect to find stations like you do on 20 metres, but what you do find several hundreds of miles away will surely give you a thrill to work. I still get quite excited when I work some new stations over the 300 mile mark, after all these years.

FIELD DAY CONTEST

The VK2 VHF and TV Group are holding their mid-winter Field Day on the 12th to 14th June, 1976. See "Contests" column for the rules.

LATE NEWS

The following has arrived from David VK4DT, and should be of interest to many.

"The Brisbane VHF Group is now operating a 70 cm beacon in Brisbane with details as follows: Call sign VK4RBB, 432.000 MHz, but shortly to be changed to 432.400 MHz, 10 watts out from solid state transmitter, nbfm, 1000 Hz tone with ±4 kHz deviation, key speed 10 wpm. Antenna 3 half wave dipoles in phase, horizontal polarisation.

Location: Wilson Heights on north side of Brisbane, approx. 250 feet a.s.l. The unit is operating on a temporary permit to be confirmed on publication of the new agreed band plan. We think this may be one of the first 70 cm beacons in Australia". **(VK6 had a 70 cm beacon for some time several years ago, and VK5 had a temporary beacon back in the sixties . . . 5LP).** David continues.

"The Brisbane repeater channel 4, VK4RBN is currently operating from West Chermside using two phased dipoles and a duplexer. Final location will be Mt. Glorious, for which a licence is to hand. Good coverage is being experienced over all Brisbane"

TELEPHONE NUMBER

Some of those interstate people desiring to contact me have been running into some difficulty with telephone contact. My number is (08) 389 1204, which is different from that shown in the directory. For business purposes this is a silent number, and will not appear in the next edition of the telephone directory. It is published here because those who have been worrying me with work problems are unlikely to read these notes, and I have no objection to my amateur friends being able to phone in special information from time to time. It is suggested all those who are ever likely to telephone me should make a note of this number **now** as it will not be repeated. You are most likely to find me able to answer the telephone personally between 0800 and 0830 EST except Wednesday. Night calls can be difficult as I periodically have meetings and other activities to attend. So now you are all in the picture. Repeat write down the above number now, where it can be found because you cannot obtain it from telephone information channels.

Let's close with the thought for the month 'Ask any man, 'Where did you buy those pork chops?' and he will reply, 'At the butcher's'. Ask any woman the same question, and she will reply, 'Why? What's the matter with them?''

The Voice in the Hills ■

AWARDS COLUMN

Brian Austin, VK5CA

ADDITIONS TO COUNTRIES LIST

Announcement is hereby made of two additions to the Countries List.

Sable Island, VX9, and
St. Paul Island, VY0

The addition of Sable Island is based on Point 1 of the criteria used for Countries List additions (". . . a distinctively separate administration") and St. Paul Island by reason of Point 3 ("separation by foreign land"). Contacts made after 15.11. 1945 with either Sable Island or St. Paul Island may be submitted for DXCC credits starting 1.2 1976.

No DXCC credits will be given for any operations from Sable Island or St. Paul Island until it has been established that landing and operation from those islands was done under specific permission from the proper authority. (QST, Jan. 76)

GOLDEN JUBILEE CONFERENCE AWARD FOR 80 Mx

The following letter has been received from Doug Whillans ZL1AFW, the Conference Secretary:

"A number of us are working Australian stations who are interested in the Golden Jubilee Conference Award for 80 Mx.

A total of 50 points scored as under —

(a) Branch stations (5 points each) Branch Number given after call. There are seven such stations, ZL1AA (02), ZL1RK (03), ZL1SA (10), ZL1QB (21), ZL1WO (29), ZL1VK (65), ZL1BQ (66). These are all Auckland Branches. A minimum of three Branch stations to be worked

(b) One member from each of the above branches, 2 points each. Further contacts with members of the above branches, 1 point each.

A total of 50 points is to be scored, only one contact with any one station to count. Contacts to be made between 1st March and 1st June 1976 Usual certified list to be forwarded to:

The Award Custodian,
P.O. Box 23-680,
Papatoetoe East, Auckland

The award is FREE

We hope your members will join us. The Club stations are rostered and most are on every evening".

NORTHERN CALIFORNIA DX CLUB — SPECIAL 1976 BICENTENNIAL CALIFORNIA AWARD

Eligibility — Any station outside the Continental limits of the United States. However, KL7 and KH6 are also eligible.

Requirements:

76 is for the year 1776, when the USA became independent from Great Britain.

13 is for the original 13 Colonies that formed the USA.

1 Work 76 stations in the US Sixth call area which are not members of the Northern California DX Club

2 In addition, work 13 stations in the US Sixth call area which are members of the Northern California DX Club.

Time limits — All stations must be worked during the calendar year of 1976, e.g Jan. 1, 1976 through Dec. 31, 1976

Verification — Required Information:

1 List 76 stations which are not members of NCDXC

A few words from "IZNIBS"

The next 12 months will see an increasing use of digital and solid state in all areas of Amateur activity! This is stating the obvious in some respects, but it is also a somewhat sobering thought that the complexity of the modern "black boxes" is a challenge to distributor and customer alike when it comes to the inevitable question of service – let's face it, they don't all last forever and sometimes even, have problems during warranty periods! What to do about it and how much it costs you is, in fact, governed by how you went about the original purchase. If purchased from an authorised distributor, such as ourselves, you have no worries service, spares, technical advice and a warranty are all there. On the other hand, the bargain price elsewhere, possibly purchased from dubious sources, may offer no guraantees – of any kind.

We often wonder why there is not more responsibility with the sales and service of amateur equipment. Of course the purists who deplore the increasing number of amateurs buying "off the shelf" are perfectly entitled to their view, but there is no reason why the technical inquisitiveness (if that's a word) of amateurs buying such equipment should not be employed to the full in knowing how their equipment works even though they may not have built the equivalent of a Uniden 2020 or an ICOM DV21 digital VFO. If you want to know more about the technicalities of your equipment which cannot be explained from the manual, drop us a line and we would be happy to help.

Uniden Corporation are making great inroads into the HF transceiver market both here and overseas. A recent costing by an executive of a large Australian electronics company (also in amateur) indicated that they could not even *produce* it in quantity for less than $1000. We have been very happy with the performance of this unit and whilst any piece of electronic equipment can develop teething troubles, these have been minimal with this set. At $570 there is no better value for money available especially when you consider that upper and lower sideband crystal filters are used and a CW filter is included in the price. With any other set this is an extra $40 odd and must be taken into consideration when making a decision. The most immediate and obvious impression from those who have bought the rig (not my impression as I don't get that much time to operate these days!) is the sharpness and sensitivity of the receiver together with its extremely good cross modulation performance – almost as good as the Atlas and that's saying something!

Whilst talking of Atlas it is worth noting that at last, these are being provided with a noise blanker – although an option, we believe they should be an integral part of the set. The noise blanker is designed specifically to blank Out the pulse type noise, the same as any other blanker, and will effectively deal with ignition noise. Other more continuous noise signals will not be silenced or reduced, a point often forgotten when assessing the effectiveness of a noise blanker.

Last but not least TRIO-KENWOOD have released to the export market the TS700A – not 144-146 as advertised elsewhere, but the full 4 MHz. If you contemplate going to the silk department this multi-mode VHF transceiver has been extensively used in its 2 MHz version for some time in Europe.

The traditional Kenwood quality with the extended coverage now available 144-148 MHz promises to make a big impact with those wanting multimode operation.

Drop us a line for further details.

73 PETER 31Z
General Manager
VICOM International Pty Limited

2. List 13 stations which are members of NCDXC
3. Give date, time, frequency and mode of each QSO

Band/Modes:

There is one basic award certificate for mixed band/modes. Stickers will be issued for each additional band/mode applied for. Example: Application may be made for the basic certificate by working 76 California stations and 13 NCDXC stations using mixed bands/modes. Special stickers will be issued for individual single bands and all different individual modes of operation: CW, SSB, OSCAR, RTTY, ATV etc. on each band. The same station may be counted for different bands/modes. Example. A station worked on 20 metres CW may be counted for the basic mixed modes award, and also for the single band 20 metre CW award.

Note: All stations worked may be used also for the regular NCDXC California award.

Charge (Cost):

Send 5 IRCs with the application for the basic award. Send 2 IRCs for each additional individual band/mode sticker.

Award Custodian:

Send list and IRCs to
Jim M. Ruys W6UZX,
3860 Pestana Way,
Livermore, CA 94550 USA

AUSTRALIAN DXCC TOP LISTINGS AS AT 14.3.1976

PHONE

VK6RU	319/351	VK2APK	300/313
VK4KS	318/337	VK4PX	297/304
VK5MS	313/343	VK5AB	291/314
VK6MK	306/333	VK3JW	291/298
VK3AHO	304/326	VK4FJ	287/314
VK4UC	301/306	VK7DK	286/292

CW

VK2EO	317/346*	VK3XB	280/300
VK3AHQ	308/31	VK3NC	268/297
VK2QL	303/332	VK6RL	266/295
VK3YL	294/317	VK3YD	258/281
VK2APK	291/304	VK4TY	253/272
VK4FJ	290/322	VK3TL	248/260

OPEN

VK6RU	319/351	VK4UC	304/310
VK4KS	319/343	VK2SG	301/311
VK4SD	315/336	VK4FJ	300/332
VK2APK	311/329	VK4TY	300/321
VK6MK	306/333	VK3XB	286/306
VK4PX	304/315	VK3TL	280/293

Transferred from Open
DXCC New member VK9AP — tally 102 ■

YRCS

Bob Guthberlet

31 Bandon Terrace,
Marino, 5049

NAME OF THE SCHEME

In the December 1975 issue of Zero Beat, Mr R. C. Black, State NSW Supervisor, has given reasons why **"The Scheme"** in New South Wales has changed the name from **"Youth Radio Clubs Scheme"** to **"Youth Radio Scheme"**. This has been done in rejection of the 1972 Constitution which specifically states, I quote, **"The name of the organisation shall be "The Wireless Institute of Australia, Youth Radio Clubs Scheme"** abbreviated **"YRCS"**.

This was unanimously agreed upon by all supervisors, including the NSW representative. Section (9) of the Constitution gives the correct procedure to be adopted for any alteration. **"This Constitution may be added to, altered or amended by the YRCS Council subject to obtaining the consent of a majority of all Supervisors, notice of any such proposed alterations having been circulated in writing by the Federal YRCS Secretary to all members of the YRCS Council at least twenty (20) days in advance"**.

In support of reverting to the original title, Mr Black has stated that the newly approved Syllabuses and Vacation Courses made the **"Clubs"** too restrictive. There may be some reasons for a change in the name, but no valid reason can be given for blatantly flouting the existing constitution under which all States have agreed upon and are required to accept. Further, the 1972 Constitution, however inadequate, was accepted and endorsed by the Federal Executive of the Wireless Institute of Australia.

As a matter of any alteration to the name of the Scheme is one for Federal YRCS jurisdiction, I would point out that the Free 2N3055 reward offered by the NSW Committee for the best title submitted is made without my approval and will have no bearing on a name-change unless Section (9) of the Federal YRCS Constitution is invoked.

The action of the NSW Committee has opened the way for any club in that State to disregard any constitution, including that of NSW and could well introduce a movement of disintegration of the Scheme in Australia.

FEDERATION

Australia today is in a state of flux, with groups and individuals protesting, resisting, and generally disregarding the elements which make up a free democratic society. In this arena of so-called radicalism **YRCS** is striving to maintain its program of assisting youth, and it behoves each of us to remember the words of an old negro: **"Your forebears came to this country in the 'Mayfair', and mine in slave ships, but remember, we are all in the same boat now"**.

In other words, no man, no State, is an island and whilst we must change our ideas from time to time, let same be done in a democratic and constitutional manner.

NEW CONSTITUTION

Following my appeal to State Supervisors to convene this subject to Executive Committees, I have received very limited answers. Will Supervisors please regard this matter as urgent and send me a copy of a complete draft. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN Jan/Feb 1976
The Origin of the NZART; Radio Teletype in New Zealand; Our Constitution — May 1928, Auckland VHF Group (Inc); NZART Current Policy 1976; A Path Through the Semi-Conductor Jungle; Improving the Argonaut; A 2 Metre Transverter for the FT200.

HAM RADIO January 1976
Synthesized Two-Metre FM Transceiver, 50 MHz Frequency Counter; Antenna and Tower Restrictions, Diode Detectors; Microprocessors; Wideband Linear Amplifier; High Gain Yagi for 432 MHz; Remote Repeater Control; Basic Troubleshooting; RAM Keyer Update; Audio-power Integrated Circuits.

CQ-TV February 1976
Indication, Circuit Notebook No 24 — Oscilloscope Calibrator; Scanning, A Repeater ATV Style; Slow Scan News; SSTV Control Circuitry; SSTV Analog-Digital Conversion.

MOBILE NEWS Jan/Feb 1976
Re-Charging Dry Cells; Antenna Filter & Splitter Unit for Two Metres.

QST January 1976
A Tramplifier for 432 MHz; A 15 Metre Goober Whistle; Simple Broadband Matching Network; An Accu-Keyer for QRP Operation; An AC Line Monitor; Learning to Work with Integrated Circuits, Pt. 1, Impedance of Short Vertical Antenna; A Scanning Touch-Tone Digit and Word Decoder; Some Capacitor Basics.

February 1976
Operation Vietnamese Refugee; Danger Lurks, To the Moon and Back; Learning to Work with Integrated Circuits — 2; UHF Antenna Ratiometry; Build a Baby Ultimate; A Multiband Phased Vertical Array, The Cheapie GP; A 2 Metre Frequency and Sensitivity Calibrator, A Digital Morse Code Synthesizer. Reviews: Heath SB 230 kW Amplifier; CES 200 & 210 Touchtone Pads; Curtis EK-430 Keyer and 8044-2 Kit. Telecom 75; Changing and Chasing; Overnight Sensation — Eloise, The First Steps in Ham PR; Be Your Own DXpedition.

RADIO COMMUNICATION January 1976
1.3 GHz Band SSB; Some Reflections on the Four Way Phasing Method; ICOM IC-201 Transceiver-Review; An Alignment Aid for VHF Receivers; An SSTV Sync Pulse Generator for 50 Hz Mains.

March 1976
A Digital Frequency Counter and Timer, WARC 1979, A 1.8 MHz Direction Finding Receiver; A Dustbin-lid Aerial for 10 GHz, The KW108 Monitorscope-Review: Improving the Keying Characteristics of the AT5 Transmitter; A 10 GHz Varactor Multiplier. ■

REPEATERS

Ken Jewell, VK3ZNJ
Peter Mill, VK3ZPP

By now you will have read our opening column in April AR and it is hoped that we will be able to keep bringing you the latest news on the repeater scene. Any person who contributes copy for the column should be aware of the likely delay in appearance. As I write this it is the 25th of March and I guess you will be reading this early in May. While on the subject of contributions, any photographs relating to repeaters such as sites, antennas, and equipment are welcome. If possible photographs should be high contrast, glossy, 8" x 10" prints. If anyone wishes to phone in any news they could ring Ken Jewell on Melbourne (03) 604 8219 and pass it along to him. You will notice this month that there is a list of Victorian Repeater details. Month by month we hope to give the details of the repeaters in the other states.

FEDERAL NEWS

The matters under consideration by the Federal Repeater Secretariat which have been referred to the States for their comment are:— 1. Draft Repeater licensing conditions. 2. The VK3 proposal mentioned last month regarding channel numbering and an additional channel. 3. The FM channel frequencies for the 70 cm band. In order for the FRS to carry out its work efficiently it must be aware of all operational repeaters and applications being processed to assist in negotiations with the Posts and Telecommunications Department and to prepare an FM Directory which will ultimately be published in the callbook. We require the following information:— (a) location, (b) ERP, (c) channel, (d) callsign, (e) type of identification and (f) legal nominee. This data should be sent to:— Federal Repeater Secretariat, WIA, PO BOX 150, TOORAK VIC., 3142.

VICTORIAN NEWS

Until there has been an agreement on the 430 MHz band FM channels Australia wide, the Victorian 70 cm Group proposes to establish an experimental manned repeater using an input frequency of 438.45 MHz and an output on 435.00 MHz to determine the possible characteristics of this band. The equipment is believed to be of commercial origin and no other details are available as yet. The proposed repeater at Mt Big Ben in the northeast of the state moved a step closer with the official approval of the use of the site. This will be followed closely by the construction of a brick hut and an 80 ft tower. The equipment will be a PLESSEY 25 Watt unit, all solid state. At present it is being tested in Wangaratta.

TASMANIAN NEWS

A second repeater is in the advanced construction stage in Tasmania and will be located at Loona which is 1 mile west of Ulverstone, on the northern coast, and at an elevation of 400 ft. It will probably be on channel 5, as this is the only one which is realistic to use due to the co-channel problems with Victorian repeaters. The site is ready with power and application has been made for the callsign VK7RNW. The equipment is solid state using an STC 131 receiver, a PYE 734 exciter, and an AWA 25 Watt final board. The repeater will have an audible ident possibly similar to that used on VK3RML.

SOUTH AUSTRALIAN NEWS

From Mt Gambier there is advice that their repeater which will probably be on channel 3, is to be located at the site of the SES8 TV studios on the side of the Blue Lake crater. It is hoped to have the callsign VK5RMG for the repeater which will have an operational range of 75 km. The equipment is in the advanced construction stage and should be operational by the time of the annual Convention in June. The gear will be all solid state PHILIPS 1680 for both the receiver and the transmitter, with an output power of 15 Watts and all the usual features such as an audible ident.

VICTORIAN REPEATERS

Operational Callsign	Ch.	Location or Service Area	Type of Ident	Range	Project Officer
VK3RML	1	Mt. Dandenong/Melbourne	Audible	100 km	VK3BX
VK3RGL	4	Mt. Anakie/Geelong	Verbal	100 km	VK3AQR
VK3RLV	2	Mt. Tassie/Latrobe Valley	Audible	80 km	VK3HV
VK3RWZ	7	Mt. William/Western Vic.	Verbal	120 km	VK3ZYG
VK3RSH	3	Swan Hill	Audible	40 km	VK3BM
VK3RAM	2	Mt. Alexander/Bendigo	FSK	100 km	VK3AAA
VK3RMA	4	Mildura	Audible	40 km	VK3BRB
Testing Stage					
VK3RBA	5	Ballarat	Verbal	40 km	VK3AMH
VK3REG	3	East Gippsland	Audible	60 km	VK3ZCG
Construction Stage					
VK3RNE	4	Mt. Big Ben Albury/Wodonga	Audible	?	VK2YGN
VK3RMM	6	Mt. Macedon/Central Victoria	Audible	?	VK3BX
Proposal Stage					
VK3RSW ?	3	Otway Ranges/SW Coast	Audible	?	VK3AQR

20 YEARS AGO

Ron Fisher, VK3OM

MAY 1956

New portable-mobile regulations were announced in Amateur Radio for May 1956. It was now possible to operate portable or mobile on all HF bands without the need for a special permit for periods of up to 24 hours. Prior to this it was necessary to apply in writing for a special portable permit for each and every excursion into the field. It was suggested that this might bring about an increase in mobile operation

Part two of the '2YY' transmitter covered testing and adjustment plus a few hints on additional TVI suppression. The basic ideas incorporated in this transmitter must have been duplicated a thousand times over as almost every Australian amateur was to build up a Geloso VFO driving one or two 6146's or 807's.

Relays, their history, use, and problems was discussed in an article which was summarised from a lecture presented to the South Australian Division by Mr Keith Main

New 'S' meter circuits were always of interest Most of the receivers obtained from disposals sources did not include meters and of course to be 'with it', an S meter was essential. J. G Oliver VK7JO showed how he did it

Volts Amps and Man Robert H Black MD continued with part two of his series and discussed amongst other things the use of low voltage portable electrical equipment

Amateur Radio magazine in those days was printed on just about the lowest grade of paper possible to get. The committee publishing 'AR' had been keen to improve this matter for some time but the budget was just as tight in those days as it is now. To whet the appetites of readers, four pages of the May issue was published on a better grade of paper. However it took quite a few years before we were able to make the change

The Urunga Easter Convention of 1956 took one whole page to describe. It must have been quite an affair ■

PROJECT AUSTRALIS

David Hull, VK3ZDH

NOTES FOR NEWCOMERS

As many mail and telephone calls clearly indicate newcomers are trying the Oscar satellites all the time. Lately the influx of **'black box'** sideband rigs for 2m has increased the number of people interested. How to work out when to listen still causes the most problems and it may be beneficial to review the procedures

The figures printed in AR each month are for the reference orbit for each day This orbit is the first one to cross the equator going south to North (Ascending node) after 0000Z (UCT). Each successive orbit will cross the equator 115 mins later The position on the equator that the satellite crosses is given in terms of longitude degrees west This figure is used as a pointer to indicate whether any particular orbit will be visible from any QTH

HI-MOUND

HAND KEYS

from BAIL ELECTRONIC SERVICES

Model HK-808. Heavy duty commercial hand key with full ball race pivots, heavy marble base and dust cover. The ultimate hand key. Price **$45.00**

Model HK-701. Heavy Duty De Luxe Hand Key, fully adjustable, ball bearing shaft, plastic protective cover. Mounted on heavy non-skid poly marble base. Base dimensions 168mm x 103mm. Price **$26.00**

Model HK-707. Economy hand key in all black ABS resin, metal parts protected by moulded ABS resin cover. **$15.00**

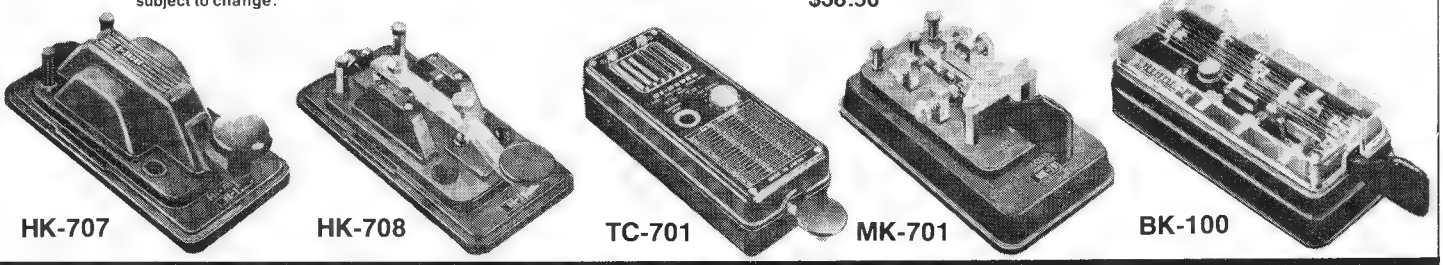
Model HK-708. Similar to HK-707 but without cover and with smart chromium plated keying mechanism and flat American style knob. Price **$9.95**

Model TC-701. Morse practice oscillator with built in key and speaker. Including battery and earphone. Copy of morse code on case. Two can be wired together to form a practice communication set. Price **$16.50**

Model MK-701. Manipulator (side swiper) for an electronic keyer. Accurate and restful keying operation are assured owing to a heavy metal plate and a frictional rubber belt beneath the periphery of the main base. **$27.00**

Model BK-100. Semi-automatic (bug) key, with standard adjustments, wide speed range, protective plastic cover, on heavy non-skid base, beautifully finished. Base dimensions 175mm x 75 mm. Price **$38.50**

Above prices include S.T./allow $2.00 P.P. and Ins./Prices and specifications subject to change.



HK-707 HK-708 TC-701 MK-701 BK-100

bail ELECTRONIC SERVICES 60 Shannon St., Box Hill North, Vic., 3129 Phone 89 2213
Distributors in Qld., NSW, S.A., W.A.
FRED BAIL VK3YS
JIM BAIL VK3ABA
JAS7576-18

The satellite crosses the equator a further 28 deg. approx. west on each successive orbit as the earth turns underneath the polar orbiting satellite. Thus by adding 115 mins. and 28 deg. successively to the reference figure in AR all orbits for any day can be calculated **Note:** Do not exceed 24 hours as the figures are not exact and errors will accumulate fast. Use the next day's reference figures

Now with a list of orbits worked out consult the standard orbit table printed in Oct. 72 and Nov. 74 AR (a SAE to the call book QTH of VK2ZDH will get you a copy if you are a new member) and take the nearest 5 deg. increment table for the long deg. W figure you have calculated. For each capital city the tables will show mins. to be added to the equator crossing and azimuth and elevation figures for antenna pointing if you have steerable arrays. Oscar 6 (145.95 +/—50 kHz in, 29.5 +/— 50 kHz out) is **'on'** Monday nights, Thursday nights, Saturday nights, and Sunday mornings. Oscar 7 is **'on'** all the time. Mode A (145.9 +/— 50 kHz in, 29 45 MHz +/— 50 kHz out) on odd days of the year. Mode B (432.15 +/— 25 kHz in, 149.95 +/— 25 Hz out) on even days of the year. Note Jan. 1 is an odd day, Feb. 1 being the 32nd day of the year is an even day

Do not exceed 100W EIRP and keep away from the passband edges for best results, also don't clobber the DUs, KH6s, KR6s, P29s, etc. The weak signal next to them is me trying to work them!

JUNE PREDICTIONS

OSCAR 6				OSCAR 7			
	Orbit	Time	Long		Orbit		Long
Date	No.	Z	°W	Date	No.	Time	°W
1	16584	00.58	70 22	1	7058	01.41	75.29
2	16597	01.53	83 97	2	7070	00.41	60 17
3	16609	00.53	68.97	3	7083	01.35	73.79
4	16622	01 48	82 72	4	7095	00.34	58 67
5	16634	00.48	67.72	5	7108	01.28	72.29
6	16647	01.42	81.47	6	7120	00 28	57.17
7	16659	00.42	66.47	7	7133	01.22	70.79
8	16672	01.37	80.22	8	7145	00.21	55.67
9	16684	00.37	65.22	9	7158	01.16	69.29
10	16697	01.32	78.97	10	7170	00.15	54.17
11	16709	00 32	63 97	11	7183	01.09	67.79
12	16722	01.27	77.72	12	7195	00.09	52.67
13	16734	00.27	62.72	13	7208	01 03	66.29
14	16747	01.22	76.47	14	7220	00.02	51.17
15	16759	00.22	61.47	15	7233	00.56	64.79
16	16772	01 17	75.22	16	7246	01.51	78.41
17	16784	00.17	60.22	17	7258	00.50	63.29
18	16797	01 12	73.97	18	7271	01.44	76.91
19	16809	00.12	58.97	19	7283	00 44	61.79
20	16822	01 06	72.72	20	7296	01.38	75.41
21	16834	00 06	57.72	21	7308	00.37	60 29
22	16847	01.01	71.47	22	7321	01.31	73 91
23	16859	00.01	56.47	23	7333	00.31	58.79
24	16872	00.56	70.22	24	7346	01.25	72.41
25	16885	01 51	83.97	25	7358	00.24	57.29
26	16897	00.51	68.97	26	7371	01 19	70.91
27	16910	01.46	82.72	27	7383	00.18	55.79
28	16922	00.46	67.72	28	7396	01.12	69 41
29	16935	01.41	81.47	29	7408	00.12	54.29
30	16947	00 41	66.47	30	7421	01 06	67 91

INTRUDER WATCH

Alf Chandler, VK3LC

1536 High Street, Glen Iris, 3146

By now I presume that all readers will have read and assimilated my message of last month. The transcript was also forwarded to all Divisions separately. The matter is so important that I wished the impact to be felt by all members, and acted upon by many

As I write this report it is early days, but I have received an acknowledgement from VK5, and am patiently awaiting such from the other Divisions Our Administration insisted that our old report forms were not acceptable to them, so the form reproduced here has been developed. It is quite simple and supplies can be obtained from Divisional Co-ordinators whom, in any case you are not aware of your Co-ordinator, I have listed below. Any help in identifications or, for that matter, anything appertaining to the Intruder Watch I am always delighted to supply on demand

Please use ball point pen and bear down.

B. Frequency:— (E) =Estimated; (M) = Measured

APPENDIX 8

Report of Intrusions into Amateur Bands

Station Causing Interference (A-F)

A. Identification

C. Emission

D. Bandwidth

F. Nature of Interference-Traffic-Remarks.

Callsign

O. Dates and Times (UT)

E. Strength (RST)

B Frequency

Station experiencing Interference (M-O)

M. Name and Callsign

N. Address

Signature

Date

Counter Signature

Co-ord.

kHz (E)/(M)

You can write to me QTHR, or break in on my skeds if you wish. Skeds are — 21260 kHz 2300 Z Wednesday mornings (EAST 9 am) — 14160 kHz 2300 Z Thursday mornings — occasionally (about one per week) on the VK3UE net, 14150 kHz 2300 Z daily except Sundays. I also often operate on the YL ISSB System on 14333 kHz at 0300 Z Saturdays. Break any of these and I can come off frequency My phone number is 509 2556, but do not ring after 9 pm please

Divisional Co-ordinators are — VK1AOP Ted Pearce, 45 Carnegie Cres., Narrabundah, 2604; VK2AFG, Les Weldon, 11 Raymond Ave., Northmead, 2152; VK3XB, Ivor Stafford, 16 Byron St Box Hill South, 3128; VK4KX, Murray McGregor, 6 Murray St., Red Hill, 4059; VK5LG, Leith Cotton, 64 Weeroona Ave., Parkholme, 5043; VK6, Albert Cash, 54 Frederick St., Shoalwater Bay, 6169; VK7MX, Max Ives, PO Box 12, Devonport East, 7310.

Station XSGU calling SUDV has been giving much trouble on 14155 kHz lately. My information is that it is a Red Chinese military station More complete information would be appreciated. Another broadcast intruder into the 7 MHz band is Radio Republic Indonesia on 7070 kHz. On 7 MHz we have Pakistan, Tirana, Cairo, Moscow, Peking (with Majak jammer) and now Indonesia What next? ■

LARA

Ladies Amateur Radio Association

Early this year a LARA newsletter was prepared and circulated to all members on the mailing list. For those who did not receive the letter or who are not yet lucky enough to be on the list, we present a summary of doings in the various LARA groups

Each state group has a few YLs who sat for the February exams and who are now anxiously awaiting

results. Some members sat the novice exam in March so we should soon have some new YL calls around.

LARA in VK5 is growing rapidly. Myrna VK5YW, who is net controller on the 80 m skeds, is one of the more active YLs in VK5, but other YLs are joining in classes and meetings.

LARA in VK3 is trying a new idea this year. Meetings are being held at members' homes instead of at the institute rooms. So far, meetings have been held at Inverloch, Mt. Dandenong, and Geelong, with the April meeting being held in Frankston at the home of Clarice VK3VB

YLs from VK4, VK2, VK7 and VK6 are all heard on the Monday night skeds which are held at 1000 GMT. These skeds are held on 3650 KHz each week.

At this point LARA would like to remind non-licensed YLs that broadcasting on an amateur station by unlicensed operators is permitted when the station licensee supervises according to the regulations, so come up and join in. It's good practice for when you get your own call! Just to show what is going on in the rest of the world we include some overseas YL notes.

For those YLs interested in joining LARA please apply to LARA, c/o WIA, Vic. Division, 412 Brunswick St., Fitzroy, Vic

In **Germany** there are about 500 YL operators, most whom work only on 2 metres. They have their own YL club and certificate To obtain their certificate one must work 10 German YL stations

CHRISTA, DJ1TE

This information came from Christa DJ1TE — who is both an active DXer and mother of two harmonics (children).

Christa was licensed in 1953 at the age of 18, and at that time was editor of their 'YL Column' in the local German radio magazine. She was then a technical assistant at a Television Station. In 1960 Christa married and went QRT for 10 years.

In 1970 she was surprised with a 5 element beam and transceiver for a Christmas present from her husband, and so DX was her aim again.

Christa is very active, especially in contests and looks forward to talking to Australian girls. One of her main ambitions is to obtain her DXCC with only YL stations — a great feat in any language

NEW ZELAND

In New Zealand, WARO, the Women's Amateur Radio Operators' Club now has 59 transmitting members which only includes 9 ZL calls. Australian members include Joan VK3BJB Heather VK3HD and Norma VK3AYL

WARO runs a certificate which requires VK stations to work 12 different WARO members. For any information about WARO write to the secretary, Celia ZL1ALK at 4 Great South Rd., Papakura Sth New Zealand or call in on the WARO nets These are on Monday evenings at 0800 GMT on 3 680 MHz ■

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

February was indeed a low in sunspot activity, producing ony a provisional monthly mean of 4.6, the previous low of 6.2 being in Mar. 75. During February, the Solar Flux fell to 69 for some 12 days in succession.

The pattern of geomagnetic activity has become quite erratic over the past few months, with the number of disturbed days increasing. During the past 12 months, there was an average of two periods per solar rotation period. This has now increased to three, which makes it more difficult to predict even one period (27 days) ahead. From past experience during the sunspot minima, they will not persist, tending to produce a minima in geomagnetic and ionospheric disturbances prior to the new cycle establishing itself. In the present ...e, during the coming 12 months.

Statements that prior to, and immediately following magnetic storms, are periods of better than average activity, were well to the fore during March.

Following the period of low activity in February, towards March 20th, a rise in solar flux to 96 and a drop in the A index to 5 produced some good openings on 15m and 10m on March 21, 22.

More spectacular were the events on March 25-27. On 25th at 0814 WWV on 5 MHz had a strong auroral buzz and was almost unreadable, but extracted the report fair to good — geomagnetic field quet — coded forecast N6 K index — 0 Solar flux (24th) was 83.

On 26th at 0814 WWV on 5 MHz still had the strong buzz, however the forecast was — poor to fair — field active — coded forecast W4 K index — 6. Solar flux (25th). 27 March was — at 0814 — poor — active — W3 K was 5. Solar flux 87 (26th).

Looking at the indices in perspective we have:—

25 Mar	Flux — 86	A — 4
26 Mar	Flux — 87	A — 86
27 Mar	Flux — 86	A — 30

The results? At 1100 15m and 10 were open from JA across to Europe. On the 26th between 0000 and 2356, or same day GMT, one DXer worked all USSR areas 0 through 9 on 10m then 15m, QSYd and, working through to two hours after sunrise completed the same on 80m. Almost had to use a cricket bat during that period.

This co-incided with the CQ WPX contest. Judging by the activity over the 48 hours, some FB DX was worked all round. It does pay to keep an ear on the WWV/H forecasts and figures as I have mentioned earlier You can often pick the optimum time to work DX when it normally isn't there. I feel sure we should see some more interesting events during the coming months, particularly around Oct./Nov. 1976.

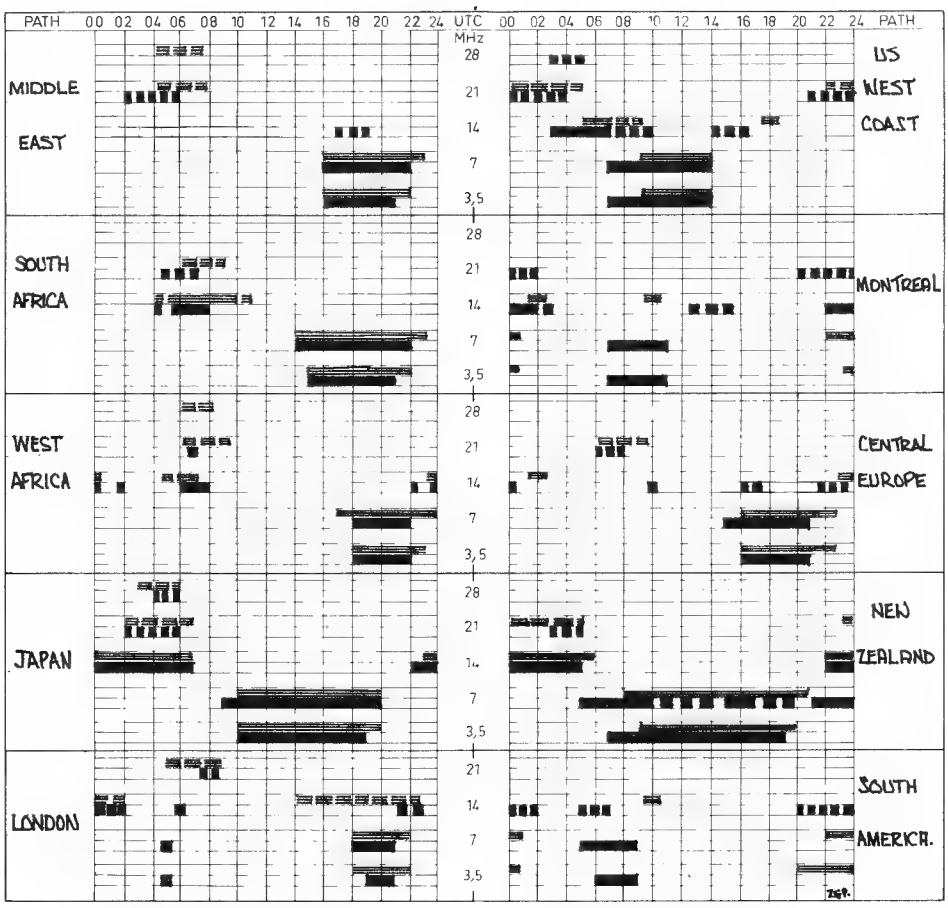


CHART LEGEND
LINES FROM WESTERN AUSTRALIA.
BARS FROM EASTERN AUSTRALIA.
ALL TIMES: UNIVERSAL (GMT).
SOLID LINES/BARS: BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.
BROKEN LINES/BARS: LESS THAN 50% OF THE MONTH. (Useful at period of increased solar activity.)
PREDICTIONS: COURTESY I.P.S. SYDNEY.
SUNSPOT DATA: DR. WALDEMEIR, SWISS FEDERAL OBSERVATORY, ZURICH.
OTHER DATA: WWV/H DAILY AT HOUR PLUS 14, 18, 45 MINUTES.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142
- Commercial advertising is excluded
- Closing date. 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book

FOR SALE

Power Transformers 240V Pri. 12V Sec. 120A, $20 Another 10, 220, 240, 260 Pri. 1700V Sec. 350 mA, $22. Yaesu FL1000 Linear E.C., $220. Johnson Viking "Courier" Linear GC 500W, pair 811A 117V AC, $120. Offers considered. VK3SX, QTHR. Ph (03) 82 2152.

FV-50B VFO, 5 band, solid state, GC, $30. Plessey ICs. SL610, SL612 3 off, SL621, SL622, SL640 2 off, Anzac MD108 Mixer, 6V IC reg, some comps and PCB suit. G3ZVC exciter, used but OK, $40 lot Valve YL1060, new $20, used few hours, $15 TRM435 — 0 — 435 @ 400 mA, 6.3V @ 5.5A, 5V @ 6A, $5. Choke 5H @ 400 mA, $3. VK3AQZ Lou. Ph (03) 751 1281 A.H. or PO Box 46, Olinda

Television Camera Phillips EL8000/01/12, one spare Vidicon and complete Handbook, $95 00 MTR151-25B STC Carphone complete with xtls for Ch. 40, $90 00 ONO. MR 20A Low Band not converted, priced to sell. VK2ZFX, QTHR

Yaesu FR100B, Rx 80-10m plus WWV. AM, SSB and CW filters. FL200B matching Tx, 240W PEP, 80-10m. Good original condx. with books, matching speaker and FC6 50 MHz converter, all for $425 Will also sell above with FL1000 matching Linear if desired, $625. VK3OQ, QTHR Ph (03) 45 4828

Complete Service Manual for Rx/R5223, showing all details for alignment, repair, construction voltage and sensitivity of each unit, plus 2 large circuits, one for wiring diagram, one as circuit diagram, all for $15. J. C. Van Ooijen, P.O. Box 141, West St. Kilda, Vic 3182. Ph. (03) 699 2400

Hallicrafters HT37 240V AC operation, AM CW SSB. Drake 2B with Q multiplier, AM CW SSB MR10 and MR20 146 Unit FM. Galaxy III, complete with PSU. 27 MHz equip TR, 2 off. No reasonable offer refused. All complete with manuals etc All in 1st class order and guaranteed to work 100 per cent Ph. (043) 96 4553

HT32 Hallicrafters Tx 230V AC PS, complete with aerial change over relay and instruction book good order, $150 ONO 1676 Low Band car phone and instruction book, $30. AR7 Rx with coils and instruction book, part mod, $50 ONO VK3AQD, QTHR Ph. (03) 459 6445.

FT75B, FV50C, DC75B PS, bought new Nov. '75 Do deal to fit FT101 or similar Tx. VK4PM, QTHR Ph (074) 62 1021.

FTDX400 Transceiver, 80-10m, including 11m, noise blanker, CW filter, silent fan, good condition. Mal Sinclair VK2BMS, QTHR. Ph (02) 407 0261 Bus., (02) 95 2362 A H

Sony 2100-CVE Video Tape Recorder, $400. Sony CVM-100VZ Monitor, $300 Sanyo Video Camera, $140. VK3 Division SSTV Kit, nearly completed, $175. Hammalund HQ 129-K Rx, offers. VK4NY Travaglia Base Hospital, Rockhampton, 4700. Ph (079) 27 6879.

FT-75 Transceiver, complete with FV-50C VFO and DC-75 mobile power supply and mounting bracket, plus homebrew AC power supply with speaker Equipment little used and mint condition with English manual and original cartons New price about $400. Will take $280 Dave Jeanes VK2BSJ, QTHR Ph. (02) 651 1316

Antenna TH3 JR, $80. Thick 72 ohm 100 ft coax $40. HT power supply, $40 VK3TL. Ph (03) 846 1516

Free to Radio Club: A fair quantity of radio parts to be collected from Templestowe. VK3TL Ph (03) 846 1516

Vinten Car Phone, L/Band, half converted to 2m, have circuit, $25. Vinten car phone L/Band, $25 IGL 2m 1W FM Exciter, $19 IGL 430 MC Converter Rx EA not completed, $25. VTVM EA not completed, $15 VK3YBR, QTHR Ph. (03) 795 2792

Pye Base Station, 25W AM 70-85 MHz, good cond no xtls, mike and stand. Pye 3A Mobile on 6Mx 53-032. Pye Leader (2) ex Taxi, 84 MHz multi Ch Pye Reporter, 84 MHz. 2 Mx AM HB Transceiver and power supply. 3-6 MHz Command Rx, 3/12 Tx, needs mod. tranny Eddystone all band Rx, needs attention. Ex Disposals Monitor Scope and spare tubes, needs attention. 5V DC 240V filtered PSU Any offers all or any? VK3UB, QTHR. Ph (03) 49 2973.

Communications Rx, gen. cov. R5223 1.5 MHz-30.5 MHz in 29 switched bands, BFO noise limiter, inbuilt PS 230/110V AC or 24V DC, all leads and inbuilt speaker, head phones and complete service manual, tested on all ranges 2 uV for 10 dB SN, spare module for modification of detector/BFO unit also, $200. C. Cook VK3ZBD, QTHR. Ph. (03) 89 2117 A.H.

Hansen SWR3, SWR — FS meter, $10. Zephyr Dynamic Car diode mike, 50K imp. with desk stand, $15. VK3PR, 6 View Ct., Leongatha Ph (056) 62 2711.

QRT Eddystone 888A Rx, $150. Canonball 10W 180 Mx Tx, AM SSB, $50. Regulated power supply, $40. 122 Set, $10. FL100B Tx, out of order, what offers? VK3AWF, QTHR. Ph. (03) 82 7926.

Gonset GSB100 Tx, mint cond., all modes, VOX manual, ideal for Novice or drive any linear, $180 or offer. HB Linear with two 811s, B&W 1 kW turret 10-80m, AC filament meter, two MA meters, $100 or offer. Pair of Selsen motors, $10. Tranpro VCT, $40. Auto-Mate electronic keyer, $35. AR7 Rx, $25. Dozens of spare valves, 813s, 814, 811As, 866s etc plus Rx valves of all types. Send SASE for list. Unique collectors items. Send SASE. VK2DA, QTHR. Ph. (02) 94 1039.

4BTV Hustler Trap Dipole, complete with 80m resonator, $50. VK2SM, QTHR

FT-200 with power supply, hardly used, $250. Pilotphone II/MR3B, $20. MTR13, $15. Base Station BTR-10R, $20. Creed teleprinter model 7B, $25 Creed reperf. type 85B, $15. Creed tape printer type 47R, $10. AC bridge BR-8, $5. VHF absorption wavemeter, $5. Multimeter H-70, $10. Marconi TF643B wavemeter, $5 BC221, $5. Mrs. Jeffries Ph. (03) 550 1066

Collins KWM2A Transceiver W/AC matching supply Drake R4C Receiver Both absolutely as new VK3ADR Ph. (03) 24 1231 Bus., (03) 20 6135 A.H

Swan 500C with 240V power supply, speaker, VOX, mic., manual and spare PA valves. Ph. (02) 759 3354

INOUE IC700 Solid State (except for Tx mixer, driver and — 2 x 6146 — output) Tx, Rx and power supply, very good condition, $250 ONO Enormous junk box to be cleared out. New and used components and assemblies, from transistors to transceivers. J. Lilley, 39 Middlesex Rd., Surrey Hills. Ph. (03) 83 3230.

12AVQ Trap Vertical, 20, 15, 10m, 4 months old excellent performer, $36. Would consider exchange for RF signal generator (old type) VK3LJ, QTHR

101B, mint condition, little use, $500 R A Watson, 69 Edmund St., Caloundra, Qld. 4551

Signal Generator HP608D (military version) 10-420 MHz(has accurate attenuator, $725 Ham-M Rotator without control box, $18. Mark Webster, 1 Fisher Ave., Waroonga. Ph. (02) 48 6241

Television Camera, Vidicon Type (Studio), $80. Teleprinter Mod. 15, $80. STC MTR121, modified 2m, $20 AWA Type 25M 2m solid state, $110. Pye 14" Studio Monitor, $35. AWA off air TV Rx, $35. RCA TV wave form monitor, $25. VK2ZPM, QTHR Ph. (02) 476 2304

10-15-20m Cubical Quad, 8' boom (2" dia) spreaders aluminium/solid F/G, complete with 3 band tri-gamma match. Also 27' Oregon Lattice Tilt-Over Tower with top support and bottom side thrust bearings $150 the lot — buyer arrange collection. VK3AZN, QTHR Ph. (03) 791 7147 AH.

FT75 SSB Transceiver, FP75 AC PSU, FV50 VFO home brew digital dial, also usable as DFM to 20 MHz, $280, all in good condition, hardly used Neil Osborne VK3YEI, QTHR. Phone (03) 763 0256

WANTED

FL2000 Yaesu Linear Amplifier. VK3BAX, QTHR Ph (052) 9 5949 Bus., (052) 9 7401 A.H.

RCP10 Controller for AD704 VHF Receiver. - Hughes, 32 Howie St, Glen Iris, 3146, Vic Ph. 03) 29 3706

SILENT KEYS

It is with deep regret that we record the passing of —

K. A. BRADY	VK2AFF
K. A. FOALE	VK5ZFK
P. C. HUTCHINS	VK5PH
BRIG. G. P. HUNT (R'td)	VK6QJ
PERCY EVANS	VK3OZ

Amateurs in Australia, and the world beyond, will be saddened by the death of Percy Evans, VK3OZ.

Born in Manchester, England, in 1883, Percy migrated to Australia in 1912. His interest in radio communication commenced in New Zealand in 1923 with the construction of simple broadcast receivers, the components of which were largely home made. He could recall with nostalgia how a few years later he sat through several nights receiving the transmission of Kingsford Smith on the first trans-Pacific flight and how, the next day he read the newspapers to check the accuracy of the reports.

In 1928, living in Sydney, he received his first amateur licence with the call sign VK2OW. Four years later in Victoria he was allocated the call that was to be his for the next 44 years, VK3OZ.

Ever an experimenter, one of his chief delights was in antenna design, and at the time of his death he was vigorously engaged in the erection of a 70 ft. high, 204BA antenna with a CDE rotator.

He made his last contact on February 1st to G4GI. Eight days later he entered hospital in Tatura where he passed away on the morning of February 27th 1976.

VK3AGG

Channel 7 Crystals for loan or hire for second week of May school vacation (15-22 May), for holiday in Grampians. MR6A crystals (4065.27 kHz, 10353.57 kHz — same as required for MR3A MR10A, MR20A, Vinten MTR13, BTR8/10 IGL) VK3ZLN, QTHR. Ph. (03) 328 4148.

Receiver 0.5-30 MHz AM CW SSB, in going order for prospective amateur Price to $200. Contact VK3ZR, QTHR Ph. (03) 89 4645 A.H.

Table for Teletype Model 15 Teleprinter. Type XRT or similar. VK3ARY, QTHR. Ph. (03) 277 4798.

Transverters — 6m, 2m 70 cm, to suit FT101, also helical or trap verticals, anywhere in between 160m to 6m Bob Yorston VK2CAN. Ph. (02) 646 0317 (9 am - 5 pm).

Swan 350 Transceiver with matching AC po supply, around $250; also Ken KP202. Prefer with Jap channels fitted. VK3OM Ph. (03) 560 9215.

ITT GH2005 Series Modem, multi level AM and vestigial sideband modulation, 2.4, 4.8 7.2, or 9 6 K/Baud rate With handbooks. Will exchange for an ASR33TTY. P Christie VK5EM Ph. (082) 223 2296.

STOLEN

ICOM 22, fitted repeaters and channels A & B 50 and 51. Ser. No. 1310858, stolen from my car in Little Lonsdale Street Any information to C.I.B Russell Street, please, or VK3ARP

QSP

QSL BUREAU

The VK2 Divisional President advises that with effect from March 1976 the WIA Hunter Branch will provide both the Inwards and Outwards QSL Bureau for VK2. The address is c/o Post Office, Teralba, NSW 2284. All previous VK2 QSL Bureau addresses are cancelled. Outwards QSL cards from VK2 members may be either posted to Teralba or left in the Atchison Street office Further details should be obtained from the Admin. Secretary, VK2 Division

MOBILEERING

According to QTC the journal of the Radio Society of Kenya, Jan. '76 issue, Mobile amateur stations are not permitted in East Africa ■

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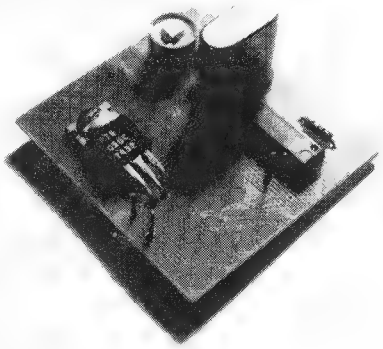

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3-Record Set Complete With Instructions Post Paid **$16.75**
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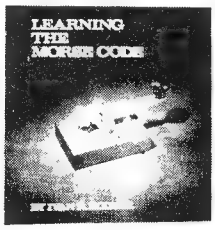

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VHF FM FROM ONE OF THE WORLD'S LEADERS YAESU

● 24 Channel FM Transceiver FT-224

The FT-224 is an advanced, solid state transceiver, that features 10 watts and 23 channel flexibility plus one priority channel, all in one compact package. Dial is marked in channel frequencies for direct read-out, and three popular channels are installed. Additional plus features include automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. A monitor switch is provided which enables checking of your own transmitter/receiver frequencies. Panel meter functions as "S" meter, transmitter RF output, and centre reading discriminator meter which enables received frequency to be checked. FET RF with five section helical resonator. Three IF filters. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.

GENERAL
Frequency Range: 146 to 148 MHz.
Number of Channels: 23 plus 1 priority channel.
Mode: FM
Frequency Stability: ±0.001%
Circuitry: 30 Transistors, 23 Diodes, 4 IC, 5 FET.
Power Source: 13.5V DC.
Antenna Impedance: 52 ohm unbalanced.
Power requirement: 0.4A receive, 2.2A transmit (DC).
Size: 180(w) x 70(h) x 220(d) mm.
Weight: 2.5 kg.
RECEIVER
Sensitivity: 0.3 uV for 20 dB quieting.
Selectivity: 15 kHz at 6 dB, 25 kHz at 60 dB.
Audio Output: 2.5 Watts at 4 ohm.
TRANSMITTER
RF Output Power: 1 & 10 watts.
Spurious Radiation: —60 dB or better.
Deviation: ±5 kHz nominal.

FT-224 (inc. 3 chns.)	**$199.00**
Extra standard channels	**$8.00**
FP-2 Matching AC PS	**$69.00**

Prices include Sales Tax. Freight and insurance extra. Prices and specifications are subject to change. All sets are pre-checked before despatch and are covered by our 90 Day Warranty.

bail **ELECTRONIC SERVICES** 60 Shannon St., Box Hill North, Vic., 3129. Phone 89 2213
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SIDEBAND ELECTRONICS SALES

UNIDEN model 2020 AC-DC transceivers 10 to 80 M with 3 crystal filters **$550**

TRIO-KENWOOD model TS-520 AC-DC transceivers 10 to 80 M. **Still only $530**

YAESU-MUSEN model FT 101-E AC-DC transceivers 10 to 160 M w. speech processor **$650**

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BARLOW-WADLEY model XCR-30 MK II portable DC communications receiver **$225**

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14AVQ 10-40 M. verticals, 19' tall, no guys **$65**
18AVT-WB 10-80 M. verticals, 23' tall, no guys **$90**
TH3JR 10-15-20 junior 3 el. Yagi 12' boom **$135**
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom **$180**
TH6DXX 10-15-20 senior 6 el. Yagi 24' boom **$225**
HY-QUAD 10-15-20 cubical quad Yagi 8' boom **$200**
TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom **$190**
BN-86 balun for beam purchasers only **$18**

ANTENNA ROTATORS

Model CDR AR-22 junior rotator for small and light beams **$55**
Model CDR Ham-II for all hf beams except 40 M ones! **$165**
KEN model KR-400 for all medium size hf beams with internal disc brake **$100**
KEN model KR-500 for vertical elevation control of satellite tracking **$100**
All models rotators come complete with 230V AC indicator-control units.
4-conductor light cable for AR-22 **20 cents per yard**
12-conductor light cable for Ham-II **30 cents per yard**
8-conductor heavy cable for Ham-II **70 cents per yard**
6-conductor heavy cable for KR-400-500 **60 cents per yard**

DRAKE W-4 SWR—WATT METER 0-200 and 0-2000 Watt scales **$60**
DRAKE TV-1000 TVI Low pass Filter **$25**
SINGLE METER SWR METER **$15**
TWIN METER SWR METER **$22**

MARK MOBILE ANTENNAS

Helical 6' long HW-40 for 40 M. **$18**
High power KW-40 for 40 M. **$25**
HW-20 for 20 M. **$16**
Swivel mobile mount and chrome plated spring for all **$12**

ASAHI MOBILE ANTENNAS

AS-2-DW-E ¼ wave 2 M. mobile whip **$8**
AS-WW ⅝ wave 2 M. mobile whip **$18**
AS-GM gutter clip mount with canle and connectors **$10**
M-Ring body mount and cap for ¼ M. whips **$5**

CUSH CRAFT ANTENNAS

Model DGPA 52-27 MHz adjustable ground plane **$25**
LAC-2 lightning arrestors **$6**
Model AR-2 RINGO ⅝ waves verticals **$20**
AR-2X RINGO RANGER double ⅝ waves verticals **$35**
ARX-2 extension for AR-2 **$15**
A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each **$60**
A147-11 11 elements 2 M. Yagi **$30**

CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals **$35**

KYOKUTO 2 Meter FM 15 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144 to 148 MHz, receive to 149 MHz, no more crystals to buy, includes simplex, repeater and anti-repeater operation. **Still only $300**

ICOM IC-202 2 Meter SSB handy transceivers, 144.0 to 144.4 MHz. **still only $185**

TRIO-KENWOOD model TS-700A FM-AM-CW-SSB transceivers, full 144 to 148 MHz coverage, 10 Watt output VFO controlled, self contained AC-DC operation **$575**

AUTOMATIC MORSE KEYERS EK-150 with built-in squeeze key paddle AC operated with monitor **$75**

FERRITE CORE BALUNS cheaper Japanese product for up to 500 W RF **$12**

COAX CABLE CONNECTORS-SWITCHES Amphenol type male for RG8U and RG58U cable, two types, female chassis mount, double male, double female, all types **100 cents each**
Amphenol angle and T-connectors **150 cents each**
3 Position coax switches **$8**
RG-8U coax cable ⅜" diam. **80 cents per yard**
RG-58U coax cable 3-16" diam. **30 cents per yard**
Add $1 cutting and handling cost for coax and rotator cable orders

P.T.T. DYNAMIC MICROPHONES 50K or 600 ohms with 4-pin Jap. plugs **$10**

DUMMY LOADS, 50 ohms with Watt meters built-in 0-200 MHz, two types 0-15 Watt and 0-6—0-30—0-150 Watt **$45 and $80 resp.**

TRIO-KENWOOD DIP METERS Model DM-800 0.7 to 250 MHz few only **$60**

27 MHz TRANSCEIVERS 5 Watt AM 6 channels with 27.880 MHz crystals **$75**
1 Watt hand-held 3 channels 27.240 crystals **$50**
15 Watt PEP 23-channels AM-SSB model SE-501 **$175**

CUSH CRAFT model CR-1 27-29 MHz Ringo ⅝ wave antennas **$35**

All prices quoted are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over $100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded.

IMPORTANT CHANGE, PLEASE NOTE!

Effective immediately all retail sales are handled by Peter Schulz, VK 2 ZXL, business address 24 Kurri Street, LOFTUS. Postcode 2232. Postal address, Postbox 184 SUTHERLAND. Postcode 2232, telephone 02-521-7573. Peter Schulz will attend to all orders, service and repairs, not $12 per hour, that is a bit stiff, $6 per hour suffices for expert attention with the aid of all sorts of modern instruments. I shall continue to back Peter, Schulz, with my business experience and finances for quality imports at the lowest available prices, a 12 year record that will not and has not yet been broken. Arie Bles.

THE W.A. BULLETIN

WEST AUSTRALIAN SUPPLEMENT TO "AMATEUR RADIO" MAY 1976

President	A. Austin	VK6MA	681808
Secretary	N. Penfold	VK6NE	463232
Treasurer	J. Kitchen	VK6TU	499342
W.I.C.E.N. Co-Ord.	P Beacher	VK6DD	763346
Program Organiser	C. Waterman	VK6NK	250541 Ext 262
Broadcast Officer	D. Reimann	VK6DY	871103
Bulletin Editors	L. Ball	VK6AN	813055 Ext 21
	R. Greenaway	VK6DA	242909
Membership Secretary	D. Wallace	VK6IW	413655

All material for inclusion in "The Bulletin", to reach the Editors by phone or to :- 22 Salisbury St., Leederville, W.A. 6007 before the 10th. of each month.

CORRESPONDENCE

All correspondence should be addressed to ;-
Hon Secretary, W.I.A. (W.A. Division)
P.O. Box N1002
G.P.O. Perth W.A. 6001

DIVISIONAL NEWS BROADCAST ----- VK6WI

SUNDAY 0930 W.A.S.T.

80 Metres	SSB	3600 KHz
40 Metres	SSB	7080 KHz
20 Metres	SSB	14100 KHz
6 Metres	FM	52.656 MHz
2 Metres	FM	Channel 1 Rpx

GENERAL MEETING

Held on the THIRD TUESDAY of each month at 7.45 pm. at Science House, 10 Hooper Street, West Perth.

COUNCIL MEETING

Held on the LAST TUESDAY of each month at 7.30 pm. at Wireless Hill. Observers are always welcome.

SLOW MORSE

Practice sessions are conducted each week night Monday to Friday inclusive on a nominal frequency of 3550 KHZ plus or minus QRM at 8.30 pm. local time

NEW MEMBERS ------ THESE ARE ALWAYS VERY WELCOME TO MEETINGS AND OTHER W.I.A. FUNCTIONS
PASS ON THE GOOD WORD

VHF NOTES contributed by Will VK6UU.

March saw the change from summer VHF to the quieter winter months .

Due to consistent easterly winds, this summer, Two metre DX was considerably less than summer seasons before. From Christmas on, conditions have been very poor and in particular to Geraldton. It appears that dry easterly winds do not make for good tropo openings.

Channel 4 into Perth showed a most unusual signal strength pattern on a Sunday morning during March. Signals went from 0.5 uV to over 20 uV for a period of 15 minutes. Indications were that this was not due to normal tropo conditions.

Still more Oscar activity in the Albany area, with Aub VK6XY being the latest on Oscar 7 mode B.

Doug VK6QR, has been doing some stirring in Kalgoorlie to get a repeater going. Present intentions are an F-60 located at the Tourist mine near Boulder. It should provide a warm welcome to Eastern states travellers on channel 4.

Channel 3 , Mount William, should be operational by the time this screed reaches you.

* * * * * * * * * * * * * * * * * * *

XYL's CORNER.

Hi, well up to date no news of any sort for this edition. As you will see by VK6EB's resume of the Wine Tasting night, a great time was had by all who attended.

Congratulations and best wishes to Shiela and John VK6ZJF who announced their engagement on March 16th.

I hear that there were some more New Zealand visitors over in the West. Edna and Ed - ZL1ACL, who were guests of Jack VK6TX and his XYL. Hope you had an enjoyable time while here. Incidentally Ed took out a VK6 call VK6EE for several weeks.

Well, hope we have more news and CONTRIBUTIONS for next time .

Cheers for now, June.

* * * * * * * * * * * * * * * * * *

FOR SALE.

Want an outboard VFO for that rig ? Here's a golden opportunity - FV50 VFO - - - make your offer to :-

The Secretary, W.I.A. Box N1002 . Perth. BUT HURRY !

* * * * * * * * * * * * * *

ALSO from the same source - Thorn Tape Recorder - 4 track.

- -

Set of new coils for 3 Band Preselector, 1.65 to 32.5 MHz, being Denco Miniature Dual purpose transistor coils - Blue range. 1 each 3T, 4T and 5T each complete with screening can. With photo copy of construction and circuitry ex Radio & Electronic Constructor July '75

Complete set $5 L60209 " KEG " 492823.

- - - - - - - - -

Albert Cash tells me that he has not had a single INTRUDER REPORT since taking over from me as VK6 Co-ordinator. THIS IS A PRETTY POOR SHOW. Whats the matter ? Too lousy to spend 18 cents to post a letter or too busy talking to listen and log an intruder ? What about bucking up your ideas a bit and send in a report instead of just YAKETA YAK like a pack of old women ? Yes - I mean YOU !

S.W.L. CORNER by MARK THREE

Well it has been a very quiet month, no correspondence, no spicy gossip, no DX. Even the XYL has been quiet. Boy. Things are crook.

Heard recently that Arthur Baxter is sporting a nice wind-up tower with Tri-Bander and 80 m whip on top. He has just returned from a holiday trip to Singapore with his XYL. Wonder what he brought back???

Eric Kay is still waiting for confirmation of the Novice Examination. - gud luck O.M.

Where is John Blaxendale these days. I miss his usual newsy letters.

A copy to hand of the Westlakes Radio Club publication "Novice Exam Q & A ". Well worth the expenditure of a couple of dollars.

SCOUT RADIO

It is less than 6 months to Jamboree On The Air for 1976. Now is the time to start dropping the hint to your local Scout Group to get them interested. If there is no one in your area then a word to Peter VK6HU or Les VK6AN will suffice as they will pass the word on for you. Remember that these Scouting types do tend to be a bit slow at comming forward at times like this but if you could make it know that you are interested in J.O.T.A. then I am sure that they will be keen to get things rolling. However, don't leave it too late as time can rush by very quickly.

Also on the Scout Radio Program is W.A. Scout Radio Call scheduled for around September. This will be held over a Saturday afternoon and evening with the idea being to make contact with other Scouts in W.A. for a general chatter and passing on of ideas. This is mostly aimed at the Scout Leaders or the very keen "radio minded" members of the Groups and reckomend that the groups in the shacks be kept quite small.

Maybe this would be a good place to start the ball rolling.

USE OF REPEATER

We note that the N.Z.A.R.T. have set rules laid down for the use of repeaters and feel that this has its merits Some of these rules are indludedhere for your information and any possible comments.

1. The Trustees to have the final responsibility for the repeater operation.
2. The repeater to be owned and maintained by the Branch
3. The repeater to be open for use by all licensed amateurs.
4, A.R.E.C. and Civil Defence requirements in areas to have priority use over normal amateur repeater traffic.
5. "Overs"to be kept short
6. Breaks between "overs" to be frequent to let other users identify and call in.
7. Stations who can work together direct without using the repeater establish contact only and then change to some other channel.
8. Home-station to home-station contacts are discouraged

cont Page 6

18th March 1976.

This is a report of a meeting held on the above date with the Superintendant of Licensing and Regulatory branch of the Australian Telecommunication Commission at Cable House Perth.

PRESENT. Mr. Trigwell and his fellow officer Mr. Field, representing Post and Telecommunications, Mr. Austin and Mr. McGhie, representing the W.I.A.

Two letters are referred to and copies are attached. Mr. Trigwell pointed out that in some instances no written requests had been received for operating deviations from accepted repeater uses so that no departmental policy had been formulated. He indicated that he was prepared to be as flexible as the policy laid down by his central office permitted, however it had to be appreciated that he could not go outside these limitations. The policy was often dictated by internationally agreed requirements, local political and commercial restrictions and lessons gained from adverse experiences in other countries or state s of Australia. This was not always easily explained to amateurs but had to be enforced.

REPEATERS.

Q. Can repeaters be used with other than A2 or F2 identification.
A. Letter 12th March '76. Other types will be considered if a written request is made. This topic is believed under discussion between central office and W.I.A. executive.

Q. Can repeaters be linked to extend their range.
A. Not under present central office policy. Has the W.I.A. executve raised the matter with central office ?

Q. Under what conditions can repeaters be tested and modified ?
A. Letter 12th March '76 Para "J". Even when operated as attended repeaters permission must be sought unless operated as a substitute for existing equipment at an already approved site.

Q. What restrictions are there for the expansion of the repeater network ?
A. Mainly those of adjacent services and already existing provisions. Each individual written application will be considered on its merits. New locations must be justified in writing with the application, otherwise no restrictions exist.

Q. In view of the fact that fees are now being charged for beacon licenses as well as repeaters is there any scheme whereby the W.I.A. could obtain a cheaper rate by group licensing or some similar arrangement?
A. Not as present policy exists. Has the W.I.A. executive ever approached the central office in this direction?

Q. What are the restrictions concerning news broadcasts through the repeater ?
A. They must conform to para. "D" of the letter 12th March 1976, and in addition meet the requirements of the letter of the 31st May 1972. They must also be pre-recorded. To aid repeateroperation the proposal of a time clock and F.S.K. ident would be given favourable attention if a written application was made.

Q. Could R.T.T.Y. be considered through a repeater ?
A. Repeaters are intended only for mobile use, not fixed station use and while this is tolerated, the requirement exists should the....

central office need or desire to enforce it. One possible avenue would be for the W.I.A. to formulate some rules like one hour a day or one hour a week to be set aside for R.T.T.Y. experiments through a repeater and then have its executive make representation to central office. Such a limited experimental use may gain support.

Q. Could amateur T.V. signals be passed through a repeater ?
A. This is similar to the R.T.T.Y. case. Has a request been made and any guidelines for their conduct been put forward ?

Q. Could repeaters be permitted on other bands ?
A. There is provision for 70cm repeaters but additional restrictions apply to that band because of radio location uses. I doubt of 6m operation would be permitted but an application to central office could test the validity of that statement.

Q. Would your office be prepared to talk to and deal with a member of the repeater group direct ?
A. Yes, if a letter is received from the W.I.A. to the superintendent authorising that person to act on its behalf and agreeing to accept responsibility for such representatives actions.

Q. What is the situation regarding crossband repeater operation ?
A. I understand a letter was forwarded on your behalf to central office on this topic to which no reply has been sighted. Has the matter been taken up at Federal level ?

Q. How is para. "C" to be interpreted with respect to the switching off of a faulty unit ?
A. A magnetic contactor or similar would suffice with an external stop button so that the device may be readily turned off but would require the equipment housing to be opened to reset the system. This to be done by an authorised maintenance person. In passing, I am not aware that this office has received keys to the W.A.N.G. site or the Wireless Hill site from the W.I.A.

Q. Could you please interpret para. "E" of the letter of 12th March?
A. The present system of resetting after a short period does not meet this requirement. It is necessary that the equipment stay off say after three five minute switch on periods that were not initiated by a received signal. This would imply some form of interrogation circuit to see if a received signal was present and incorporate an additional timer which does not reset if three consecutive malfunctions occur.

BROADCASTS.

Q. Must broadcasts be pre-recorded ?
A. Yes, it provides for a better service and aids better placement of identification intervals as well as providing a means of
(a) checking content before going to air and
(b) providing a useful record in the event of any query.

Q. Because of the difficulty of appointing a permanent Broadcast Officer the Institute finds it necessary to frequently change the location from whence the broadcasts originate. What flexibility exists for this to be done?
A. My letter of the 31st May,1972 provides for this without prior notice to this office provided that the person is an authorised

member of the Institute. A practice which is sometimes overlooked is that on such occasions the call VK6AWI must be used. Repeating stations should as often as possible give their own callsigns when the originating station, VK6WI or VK6AWI breaks the news to give its callsign.

GENERAL COMMENTS.

A letter would be appreciated giving details of the time out facilities, the F.S.K. shift and operating method for the news transmissions via the channel one repeater as soon as possible. Authorisation could then be considered for these alterations. Many of the delays which occur to mail concerning the previously discussed topics are unfairly attributed to this office. Yet despite a staff shortage this is not the case. Such mail is set on with little delay only to be delayed in the central office where sheer pressure of work prevents its immediate attention. Should you have any queries of a nature which would have been previously attended to by the now suspended advisory committee please feel at liberty to ring Mr. Field, Mr. Knight, or myself (Mr. Trigwell) and we will help in any way possible.

In closing this report I would like to thank Mr Trigwell and Mr. Field for their time and consideration. In addition I thank Mr McGhie (VK6UU) for his valuable help at the interview.

I suggest a copy of this report be forwarded to the Repeater Group and the Superintendent Mr Trigwell. Likewise a copy should be placed on file and any of the matters considered worthy of a letter to Federal Executive followed up with appropriate action.

A.M.Austin.
Divisional President.

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ZL TYPE REPEATER RULES. contd.

9. The Radio Regulations to apply at all times notwithstanding anything in these rules.
10. With exception of mobiles,stations should not call a general CQ.
11. Stations using the repeater to identify when calling.
12. No one to be excluded from legitimate operation.
13. QSL's should be clearly marked " via repeater ".
14. Contacts via the repeater will not be recognised for any contest or award.
15. A copy of these rules and the names of the Trustees to be posted on the Branch notice board.

Special Conditions : Some repeaters will have special operation notes, and these will be in a Footnote, under the repeater entry in the Annual Call Book.

* * * * * * * * * * * * * * *

REPORT ALL INTRUDERS.

An Evening with Bacchus.

At about 10.15 a voice enquired " would you two gentleman please record the events of the evening for the Bulletin." We sobered up immediately but it was too late, all that seemed to be retained was the pleasant taste of the after dinner port.

It was therefore after a great deal of effort, and many enquiries to those who could remember a little here and a little there, that it has been possible to chronical the events that occured.

The evening referred to was that of the third Tuesday in Marc during which the general meeting was followed by a wine tasting. The minor events were dispatched with haste, and everything was ready for the serious part of the evening by about 8.00 p.m.

The 48 runners, members, wives and visitors lined up at the starting chocks, and after a short address by a member of the Australian Wine Bureau, proceeded to the tables by the shortest possible route

We were first introduced to the appetizer wines, which consisted of a selection of sherries ranging from dry through to sweet. These were served with savouries attractively arranged on the tables with a colourful array of wine information booklets.

The sherries were followed by a range of sparkling wines which unfortunately ran out before the interest which they created.

A publicity film on Australian wines and winemaking was next on the agenda. This recess gave the caterers an opportunity to lay the tables for the buffet dinner which was to follow. The film content later served as the subject for a light- hearted quiz, with bottles of wine offered as prizes for the fortunate winners.

The dinner was served with a variety of red and later white table wines, in this case a selection of port.

The entire evening was full of good fun and humour and will be laughed over by those present for a long time. Those who did not attend are the sorry losers.

The success of the evening was due in no small measure to the Australian Wine Bureau, the excellent catering and the good management of the W.I.A. organisers.

Contributed by Frank VK6FW & Les VK6EB.

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REMEMBRANCE DAY CONTEST 1976.

Dont raise your shaggy eyebrows at me sport, it may seem a long way off, but in actual fact the intervening months will fly past.

What are WE going to do about the contest this year ? Should we throw up our little hands in despair and say " the rules dont favour us so I dont think I'll enter".Or are you one of those smart - - - - - who wait until the last hour of the contest hoping to be swamped with calls then proudly announce " I worked 88 contacts and was only on for an hour."If you personally are not the least bit interested in R.D.what about loaning your gear to someone who could make good use of it ? Perhaps you come from another country and ANZAC has little or no meaning for you, or the fact that Australian and New Zealand amateurs gave their lives, and that's what the contest is all about,doesn't worry you one little bit, Dont KNOCK or WHITE*ANT the contest. What about a team effort from VK6 this year ?

WATCH FOR FURTHER DETAILS.

From our Treasurer, Jon VK6TU comes this interesting run-down on Finance. . . . . .

1975 Comparison between W.A. and S.A. Divisions of the W.I.A.

	W.A.	S.A.
INCOME.		
Subscriptions	1372	3023
Trading	341	2933
Levy Donations	nil	934
Interest	360	428
Sundries	32	62
	2105	7380
EXPENDITURE.		
Audit	60	151
Building Amortization	nil	509
Convention	"	138
Depreciaton of Equip.	272	204
Honoraria	nil	200
Insurance	47	140
Bulletin (W A for 15 m	323	479
F.E. Levy	1210	2329
Australis donation	nil	100
Station Licences	96	48
Post. Stationery T/ph.	184	306
Rent	161	42
Maintenance	62	nil
Social Activities	150	330
Sundries	143	184
	2719	5009

LOSS for W.A. $614
PROFIT for S.A. $2371

From S.A. Bulletin April 1976.
J. Kitchen TREASURER.

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MEMBERSHIP.

H E L P ! ! !

If you have recently gained a new call or changed your old callsign, or if you have changed your address PLEASE help us to keep the records up to date by notifying Dave Wallace. Incidentally Dave advises that if anyone wishes to contact him they should write to him at his station address as per the call book, 6ZIW, NOT to the P.O. Box number.

Here are the latest figures.

Full members	248
Associates	63
Stud. Pens.	33
Life	5
	349

Who'll make it 350 ? Any offers ?

A total of 58 people are still unfinancial - so what about it you guys send in your subs quick quick so as to avoid missing out on A.R.

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Support your Council - Lighten their Load!